Commercial Fisheries Abstracts

a monthly summary of important developments for the fishery industries

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FRED A. SEATON, Secretary

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JOHN L. FARLEY, Director

Commercial Fisheries Abstracts

Prepared in the Branch of Commercial Fisheries

EDITORS
A. W. ANDERSON, Chief, Branch of Commercial Fisheries
DONALD Y. ASKA, Chief, Educational and Market Development Section

ASSOCIATE EDITOR
MAURICE E. STANSBY, Chief, Pacific Coast and Alaska Technological Research

ASSISTANT EDITORS
KATHRYN L. OSTERHAUG, Fishery Products Technologist, Seattle
F. BRUCE SANFORD, Chemist, Seattle

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In addition to the regular abstracts, there is included a bibliography of references of secondary importance (without abstracts). These may be cut off on the lines designated and pasted on standard 3 x 5-inch cards for filing.

Following is a brief outline of this filing system. The numbers apply to the first digit appearing on each card. For the meaning of subsequent digits, please see the above described leaflet.

0	General and theoretical	5	Vitamins
1	Fish by species	6	Fishery byproducts
2	Fresh fish	7	Analytical Methods
3	Preserved fish	8	Composition
4	Oils	9	Miscellaneous

Issued with the approval of the Bureau of the Budget, December 29, 1953

1.0118 COMMERCIAL FISHING IN WORLD'S LARGEST LAKE

Anonymous
National Fisherman 37, 14-15, 26 (June 1956)

Whitefish, lake trout and herring are the principal varieties of commercial fish caught in Lake Superior; smelt, white and redhorse suckers, burbot and several other species are considered rough fish. The rough fish are taken in large commercial quantity.

Commercial fishermen unloading a good catch of lake trout at Marquette, Mich. The fishermen's dock lies in the background.

Gear used by the fishermen of Lake Superior include set hooks, gill nets, pound nets, trap nets, and hand trolling lines. Open water fishing is carried on for about 9 months of the year. In mid-winter fishermen fish through the ice.

Introduction of the deep trap net in the late 1920's resulted in huge catches of whitefish and threatened possible extinction of the species. To preserve the fishery, legislation was enacted prohibiting their use in Lake Michigan and in Lake Superior.

(over)

ABSTRACTER: Kathryn L. Osterhaug

1.0116 CONDITION OF THE MIDDLE ATLANTIC POUND-NET FISHERY

June, Fred C. (U. S. Fishery Laboratory, Beaufort, North Carolina)
Commercial Fisheries Review 18, 1-5 (April 1956)

Of the 14 fishing companies that operated an estimated total of 45 pound-nets in the vicinity of Ocean City, Maryland during the 1920's, none remain today. For over 100 years, pound or trap nets were used to exploit the various species of migratory food fish that inhabited the shallow waters along the middle Atlantic Coast during the summer. It is of interest to consider the possible factors which may have contributed to the loss of this fishery.

Table 1 gives the pound-net landings in New York and New Jersey from 1939 to 1951. It may be seen that, apart from annual fluctuations, a downward trend in catch had its beginning in 1944 when the catch dropped 8 1/2 million pounds, or nearly 20 percent below that of the preceding year. The reversal of the downward trend that occurred in 1951 was attributable to increased landings of menhaden which accounted for over two-thirds of the catch in that year.

Table 1 - Pound-Net Landings in New York and New Jersey, 1939-1951

Year	New York	New Jersey	Total
	(1,000 Lbs.)		
1951	4,906	40,093	44,999
1950	3,026	15,127	18,153
1949	2,848	21,993	24,841
1948	2,915	24,170	27,085
1947	3,403	28,724	32,127
1946	5,647	1/	1/
1945	6,646	30,684	37,330
1944	5,753	30,948	36,701
1943	6,402	38,880	45,282
1942	6,197	37,611	43,808
1941	1/	1/	1/
1940	8,383	30,229	38,612
1939	7,327	39,107	46,434

1/ Data unavailable.

The decline in importance of the pound-net fishery in the middle Atlantic region has been attributed to (1) a decrease in abundance of the migratory food-fish stocks, (2) changes in hydrographic conditions, (3) pollution in our coastal waters, and (4) competition from other gears, especially trawlers.

(over)

ABSTRACTER: Kathryn L. Osterhaug

2.1121 UNDERWATER TELEMETER FOR DEPTH AND TEMPERATURE

Stephens, F. H., Jr. and Shea, F. J. (U. S. Fish and Wildlife Service)
Special Scientific Report: Fisheries No. 181, United States Department of the Interior, Fish and Wildlife Service, Washington, D. C. (June 1956), 22 pp.

This report describes the construction of a telemetering depth-measuring instrument to be used with midwater trawling devices in exploratory fishing and gear research. The objective in developing an instrument of this type is to enable the research fishing vessel to lower the midwater trawl to the exact depth where concentrations of fish occur, as determined by echo-sounding equipment.

A complete communication system consists of a transmitter, a transmission medium, and a receiver. In a telemetering system, the transmitter encodes or translates the desired information into a form that may be carried easily by the transmission medium and that then may be reclaimed at the receiving end. In many cases where high accuracy is required, serious problems in design are encountered because each link of the telemetering "chain" has the ability, in one way or another, to scramble the information being transmitted and to destroy accuracy.

It was necessary to design an instrument to give continuous depth information over a range from 0 to 200 fathoms with a resolution having an error of not more than ± 1 percent. Reliable transmission was required over a distance of 5,000 feet.

The speeified requirements determined the basic design of the instrument. In addition to accuracy, stability, operating distance, and operating time, there were numerous mechanical aspects to be considered, such as pressure seals and housings.

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ABSTRACTER: F. Bruce Sanford

2.9 STUDIES ON THE FOOD POISONING ASSOCIATED WITH PUTREFACTION OF MARINE PRODUCTS

Kawabata, Toshiharu; Ishizaka, Kimishige; and Miura, Toshiyuki
Bulletin of the Japanese Society of Scientific Fisheries 21, No. 5, 335-351 (1955) (English abstract, figures and tables)

I. Outbreaks of allergy-like food poisoning caused by "samma sakuraboshi" (dried seasoned saury) and canned seasoned mackerel.--Marked differences were observed in the amount of histamine found in dried saury and canned mackerel. Crude methanolic extracts caused a greater rate of contraction of intestine by the Magnus' method than the control.

II. Causative toxic substance and some of its chemical properties.--A toxic substance was successfully isolated from the methanolic extract by means of paper-partition chromatography. The substance or spot as it appeared on the paper with ninhydrin was brownish purple and distinguishable from that of histamine on the basis of its Rf value and its reaction with diazo reagent. This substance was easily extracted with 80 percent methanol at room temperature, was insoluble in ether, acetone, benzene, chloroform, or absolute ethanol, was considerably heat stable, and was dialysable against a cellophane membrane.

III. Physiological and pharmacological properties of newly isolated vagus-stimulant, named "Saurine."--The toxic substance isolated above is different from acetylocholine and seems to have an additive effect with histamine. The skin reaction on rabbits and the shock symptoms in guinea pigs that result from injection of this substance agreed with those of histamine. Anti-histamine drugs were much more strongly antagonistic to this substance than anti-acetylcholine drugs on the basis of contraction of the intestine. The findings mentioned above suggest that this substance is an autonomic

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ABSTRACTER: Martin Heerdt

LAKE SUPERIOR FISHERIES

POUND-NET FISHERY

DEPTH TELEMETER

HISTAMINE-LIKE FOOD POISONING

1.0116 (Cross Reference: 2.1124)

The records suggest, however, that the decline in importance of the pound-net fishery was due primarily to the downward fluctuation in availability or abundance of the valuable food-fish stocks upon which the fishery was dependent. In contrast to the downward trends in valuable food fishes, there has been a steady increase in landings of less valuable food species and industrial fish. Arbitrarily included among the so-called "trash" and industrial fish are menhaden (Brevoortia tyrannus), cusk (Brosme brosme), skate (families Rajidae, Dasyatidae, and Rhinopteridae), sea robin (Prionotus sp.), herring (Clupea harengus), squirrel hake (Urophycis chuss), white hake (Urophycis tenuis), sharks, anglerfish (Lophius americanus), tautog (Tautoga onitis), conger eel (Conger oceania), wolffish (Anarhichas lupas), swellfish (Sphaeroides maculatus), alewife (Pomolobus pseudoharengus), dogfishes (families Squalidae and Triakidae), kingfish (Menticirrhus saxatilis), pilotfish (Naucrates ductor), squid (Loligo pealii), and horseshoe crab (Limulus polyphemus).

The efficiency of fishing vessels has increased through mechanization and the use of electronic equipment, whereas few improvements have been inaugurated either in the operation or construction of pound-net gear. The large 25- to 30-pole rigs still require 7 to 9 men on a basis of 3 or 4 hours work each day over 6 or 7 months of the year. It is unlikely that any commercial fishery could operate profitably on a labor expenditure of less than one-quarter day per man, especially during periods of low fish abundance.

Smaller units of gear could be operated more efficiently and economically. Eight to ten pole rigs with minimum-sized pockets could be handled by 2 or 3 men with a reduction in operating costs. With smaller units, fishermen could operate more gear and thus fish over a greater area. Also, smaller nets would probably survive stormy weather with less damage and thus permit their operation over a longer period of the year.

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nervous toxin and resembles histamine as far as its action is concerned. This poisonous substance was isolated originally from the saury (Colalabis saira), therefore the authors have suggested "saurine" as a name for the toxic substance.

1.0118

Two Lake Superior commercial fishermen unloading gill nets at Marquette, Mich.

Hauling in a fish by gill net lifter aboard the Lake Superior fishing tug "Peter A".

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The telemetering system chosen for the instrument is a compromise. The problems of time, cost, and convenience weighed heavily in the electronic and mechanical design, and the finished unit is neither intended nor offered as the ultimate. The instrument seems to work exceptionally well, however, and it may prove to be a dependable and flexible device, which, through modifications or variation, could provide numerous services to these studies.

1.2 THE MAINE SARDINE INDUSTRY IS STILL GROWING

Anonymous
The Canner and Freezer 122, 11-14 (April 30, 1956)

Maine produces almost all of the ¼ pound flat cans of herring sardines produced from small sea herring in the United States. Although California produces a large volume, the fish used is the pilchard, which is much larger than Maine herring. Most of the California fish are packed in tall or oval cans. The sardines from Norway differ as they are either Sild or Brisling.

About 83 percent of Maine's sardines are packed in soybean oil, 5 percent in peanut, olive or cottonseed oil, and 12 percent in tomato or mustard sauce. The demand for sardines in mustard and tomato sauce is increasing. Previous to 1935, cottonseed oil was used extensively.

Maine's pack of sardines fluctuates from year to year with an average of about 2½ million cases (100 cans per case). The fishing season - from April 15 to December 1 - is set and limited by law. The fish are caught in purse and stop seines and weirs. After a school is trapped in the nets, the cannery is notified and a carrier boat is sent to take in the catch. Hugh pumps draw the fish into water-tight tanks in the carrier boats. The scales are removed in this process and used in several industries. The sardines are then rushed to the cannery where the employees are ready to receive the raw product.

Five methods are used to process sardines. One is the conventional flake method still used by the majority of canners. The fish are precooked with live steam and hot air, then dried and packed into cans. In a new method, the fish are packed raw in the cans and then cooked. Oil is then added, and the cans sealed. Other processes are the draw pack, baked, and fried in oil.

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 ABSTRACTER: W. H. Dumont

2.15 NOTES ON HANDLING FISH ON THE TRAWLER

MacCallum, W. A. (Atlantic Fisheries Experimental Station, Halifax, N. S.)
Fisheries Research Board of Canada, Progress Reports of the Atlantic Coast Stations No. 62, 32-36 (July 1955)

These notes outline (1) the combination of practices which may lead to deterioration in quality of cod and haddock at sea and (2) the means available for preventing this deterioration.

Rough handling.--Fish spoilage and reduced fillet yield results from towing the trawl for too long a period, trampling on and crushing the fish, indiscriminate use of forks, storage for a long time on deck, faulty handling during evisceration and stowage in the hold, and faulty handling upon removal from the hold. Blood stains can be avoided by not walking on or bruising the fish and by eviscerating them as soon as the empty trawl has been dropped. Bruising and crushing of the fish below deck can be reduced by conveying the fish via chutes, by forking only in the head, by stowing the fish on shelves in shallow layers in ice, and by unloading the fish in ice from the front to the back of the shelf, one shelf at a time.

Contamination.--To minimize bacterial contamination the viscera from dressed fish should be kept from contact with the other portions of the catch and be carried or washed away frequently or continually. Washing the fish both before and after they are eviscerated will help greatly to minimize bacterial build-up.

Icing.--Even with careful handling, bacteria will grow on fish and produce significant spoilage within a few days after storage in ice if the fish have not been properly iced. The purpose of ice in keeping down bacterial spoilage is to chill the fish, to keep them cold, and to shield the fish from

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 ABSTRACTER: Martin Heerdt

2.01 CONTROL OF POST-MORTEM BACTERIAL SPOILAGE OF WHALES WITH CHLORTETRACYCLINE

Crean, P. B.; Tarr, H. L. A.; and Barker, R. B. (Technological Station, Vancouver, B. C.)
Fisheries Research Board of Canada, Progress Reports of the Pacific Coast Stations No. 105, 6-10 (February 1956)

One of the most serious problems in the handling and processing of whale carcasses is bacterial spoilage. The viscera, and possibly even the live flesh of these warm blooded mammals, is inhabited by putrefactive bacteria which thrive in the absence of air. Under these circumstances advanced spoilage, which is favored by very slow cooling, may occur within one day after death.

Experimental.--Preliminary experiments were made to determine if chlortetracycline hydrochloride (CTC) would be effective in retarding bacterial spoilage of whale carcasses after death and before processing. The peritoneal cavities of whales are inflated with compressed air after death to obtain a positive buoyancy and to facilitate towing. This practice makes possible the introduction of CTC solutions simply by sucking it into the compressed air line which,with its attached spearhead, is used to inflate the whale. Tests showed a substantial atomization of the CTC solution in the four 1/4-inch holes which were bored above the tip of the spearhead.

In the experiments, the whales were hauled in on a forerunner of the boat within 1 1/2 to 3 hours after death. Then 5 gallons of water containing 1 ounce of CTC was injected at each end of the peritoneal cavity along with the compressed air used to inflate the whale. The spear used to inject CTC and air was manipulated from the gun platform.

Results.--The criteria used to compare treated and untreated whales and the results reported in the table (see over) show that CTC retards spoilage in whales. Further experiments are planned.

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 ABSTRACTER: Martin Heerdt

3.23 TOPICAL TECHNICAL REFRIGERATION PROBLEMS

Anonymous
Fiskeridir. Skr., Ser. teknol. Undersok. 2, 149 pp. (1954)
Food Science Abstracts 28, 28 (February 1956)

The proceedings of a conference on the freezing of fish, held at Bergen, in November, 1952. Papers were read on the following subjects: basic problems in preservation by freezing (E. Heen) (pp. 9-16); investigations on the freezing of herring (O. Karlsen) (pp. 16-28); freezing of herring from an industrial viewpoint (E. Oftedal) (pp. 28-34); freezing of sturgeon (E. Schjolberg) (pp. 34-39); theory and practice in the construction of quick-freezing plant (O. Helgerud) (pp. 39-62); fillet packaging in general (A. Johansen) (pp. 62-71); packaging in the Norwegian freezing industry (H. Richardsen) (pp. 71-77); development of cardboard packages (E. Iversen) (pp. 78-81); diffusion of water vapour through materials used for packaging frozen foods (E. Biendeng) (pp. 81-84); methods of processing fish offal (E. Sola) (pp. 84-86); new by-products (E. Heen) (pp. 86-91); new methods for extraction of fish oil (L. Aure) (pp. 91-99); filleting and packing plants (J. Lorentzen) (pp. 99-108); pallet-lift truck system (N. Johansen) (pp. 108-117); planning and construction methods (H. Tveitsme) (pp. 117-125); automatic control of industrial refrigeration plants (G. Lorentzen) (pp. 125-143); and automatic control of refrigeration plants from the viewpoint of machinery firms (M. Slinde) (pp. 143-149).

 ABSTRACTER: Reprinted in whole

2.01 (Cross Reference: 1.95)

Effect of chlortetracycline on treated and untreated whale tissue

Whale	Condition	Location of sample	Tot. vol. base[2]	Bacteria[3]
CTC-treated 44-ft. male sperm, 48 hours dead	Good appearance, sour meat odor, some meat with gas spoilage, 0.7% free fatty acid	Surface muscle under blubber	41.6	637
		Deep muscle near backbone	11.0	50
		Deep muscle non-injected side	130	2
		Muscle near liver	76.0	34
Untreated 44-ft. male sperm, 43 hours dead	Burst visceral cavity, very sour meat odor, 2.1% free fatty acid	Deep muscle behind skull	194	48
		Outer muscle from back	158	90
		Deep muscle near backbone	129	170
		Deep liver	390	1700
CTC-treated 50-ft. male sperm, 43-hours dead	Similar to number 1, above, 0.07% free fatty acid	Deep muscle near backbone	16.5	3
		Deep muscle behind skull	11.0	7
		Deep muscle near tail	7.7	2
		Liver tip	214	37
CTC-[1] treated 33-ft. male humpback, 26 hours dead	Good appearance, no off-odor in meat, best of whales	Deep muscle near throat	14.0	5
		Deep muscle near backbone	12.3	0
		Deep muscle near tail	8.8	0
		Deep liver	28.0	0.8
Untreated 41-ft. female humpback, 26 hours dead	Green discolored blubber. All meat with gas spoilage	Deep muscle near backbone	88.0	40
		Deep muscle behind skull	102	353
		Surface muscle under blubber	196	450
		Deep liver	105	143

1/ Plus ounce of CTC in bomb head. 2/ Mg. nitrogen per 100 grams. 3/ Direct count (millions per gm.)

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1.2 (Cross Reference: 1.0115, 3.33)

In 1951 the industry requested to be taxed 25 cents per case. The legislature passed the law as an emergency measure and it is now a tax that everyone must pay. The money is used for general development of the industry including technological research, quality control and improvement, advertising, merchandising and promotion. The program has proved to be a workable one.

Market research shows that Maine sardines account for 70 percent of all the sardines sold in the nation. The balance was shared by California pilchards and imported sardines from Norway, Portugal, France and Morocco. The Maine sardine industry is relying on its promotional program to hold its position in the American market. The canners realize that it takes quality to make a promotion work.

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contamination. This means that enough ice must be used to enter between the belly flaps, to separate the fish from each other and to separate the fish from the pen boards. Separating the fish from the pen walls and floor not only shields them from the contamination of the slime-soaked boards but also provides passage for ice water drainage and air movement. Without ice to provide an air space between the fish and the pen boards anaerobic spoilage will occur and produce obnoxious bilgy odors.

Methods of icing.--Proper icing requires a bed layer of fine ice 8 inches deep in the bottom of the pen surrounded by a ring of fine ice 5 or 6 inches higher than the bed layer all around the perimeter of the pen. Fish are placed in this saucer of ice to a depth of 5 or 6 inches. Then a layer of fine ice is laid over all of the fish to a depth of 1 1/2 inches and a ridge of fine ice 5 to 6 inches deep is laid on top of the 1 1/2 inch bed all around the perimeter of the pen. The process is now repeated with 2 more successive layers of fish and ice so that there are 3 layers of fish in all on the shelf of the pen. Shelf boards are then laid down on battens along the pen walls and the process is repeated beginning with a saucer of fine ice. Separation of the individual fish can be accomplished by stowing the fish loosely and by using fine ice that will sift down between the fish.

Amount of ice.--Large, offshore, uninsulated trawlers with wood lined fish rooms need about 3/4 pound of ice for each 3 pounds of fish to chill the fish, about 0.55 pounds of ice for each 3 pounds of fish to keep the fish cool, and about 0.70 pounds of ice for each 3 pounds of fish to keep the fish separated. An insulated trawler with refrigeration, and metal fish pens which can be washed free of contamination after the fish have been unloaded, will require 1/2 of the above icing requirements.

2.15 THE CHILLING AND FREEZING OF FISH

MacCallum, W. A. (Atlantic Fisheries Experimental Station, Halifax, N. S.)
Canadian Fisherman 43, 6, 8, 10, 24-25 (March 1956)

This paper presents a survey of certain commercially tried, successful methods for keeping fish under refrigeration and of more recent developments in the technological and engineering fields which may have a bearing on future fishery operations.

Part I - Developments at Sea

Tuna.--The practical application of the freezing-fish-at-sea concept to the West Coast tuna fishery resulted in the development of the Pacific Tuna Clipper, which uses refrigerated brine wells for chilling and freezing the fish. The importance of immediate chilling and freezing of tuna has been emphasized by the early investigators. The clipper method of freezing is limited to fatty fish like tuna, salmon, and sardines which absorb salt from the brine very slowly. Its principal contribution will be confined to the engineering innovations set forth.

Groundfish.--An extensive investigation has been conducted into the rapid freezing of ungutted haddock in brine aboard the U. S. Fish and Wildlife Service trawler Delaware and into the use of this product for frozen fillet production ashore. The Delaware method is unique in that cooling of individual fish is assured since the fish are moved through the brine, and not the brine through the fish as employed in all other freezing-at-sea methods. Fish freeze rapidly and without distortion.

The French contribution in the field of freezing at sea is in the use of freezers for handling part of the catch, the remainder being salted. This arrangement provides for the use of many fish formerly

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 ABSTRACTER: Max Patashnik

2.9 INTERIM PLAN FOR STANDARDIZING THE BIOASSAY OF PARALYTIC SHELLFISH POISON BY USE OF A REFERENCE STANDARD

Anonymous
Department of Health, Education, and Welfare, Public Health Service, Washington 25, D. C. (May 7, 1956)

Introduction.--Prevention of poisoning due to eating toxic shellfish has been a problem of concern to health and fishery authorities for many years. On May 26, 1955, State and Federal agency representatives attended a Public Health Service sponsored conference to discuss recent developments in the assay for shellfish toxicity. The most significant developments reported were the isolation of the poison in pure form and that certain color reactions, such as the Jaffe and Benedict-Bahre tests, could be used as the basis of chemical assay for the poison.

Objectives.--Since the principal objective of the conference was the establishment of a uniform procedure for bioassay of shellfish poison, it was agreed that (1) purified poison should be used as a tentative reference standard, and (2) results of future bioassays should be reported in terms of weight (micrograms of poison per 100 grams of shellfish meat) of poison. A plan has been established whereby the Public Health Service will distribute to laboratories interested in standardizing their bioassay procedure, samples of the purified poison for use as a reference standard. Certain obligations are listed with which the laboratories wishing to participate must comply.

Three procedures are listed as follows:

1. A procedure is given for the bioassay of the reference standard solution and the method of computing the conversion factor expressing the micrograms of poison equivalent to one mouse unit.

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 ABSTRACTER: Clarence J. Carlson

2.8 BAKED STUFFED TROUT

Anonymous
Institutions 38, 168-169 (April 1956)

A Newark, New Jersey restaurant serves an exciting entree which the chef describes as a melange of salt water fish in sweet fish. This baked stuffed trout is served with a variety of sauces and garnishes, such as fresh tomatoes in wine sauce with chives, sauteed avocado and tomato with lemon sauce, or wine sauce with fine herbs.

The fish mousse for stuffing is prepared by mixing ground white fish with bread slices moistened with cream, minced shallots, chopped parsely, salt, and cayenne pepper. Thoroughly blended egg white is added and the mixture stuffed into trout that has had the entire backbone removed. The trout is then baked on an oiled baking pan 7 minutes at 400° F. The fish should show delicate blisters and be nicely browned when done. Garnish with favorite sauce and serve with baked potato and garden salad.

Baked stuffed trout is easy to prepare and equally suitable for a la carte service or preparation in large quantities.

 ABSTRACTER: Thelma S. Rose

3.33 HEAT PROCESSING OF BEEF

Hurwicz, H. and Tischer, R. G. (Iowa State College, Ames, Iowa)
Food Research 21, 147-161 (March-April 1956)

Part VI. Thermal Diffusivity and "Slopes" of Heating and Cooling Curves for the High-Temperature Process

On the basis of experimental evidence and its statistical interpretation it may be concluded that:

Thermal diffusivity does not depend on the location in the container; it may be, however, a function of processing temperature and reaches a maximum for 261-279° F. ($k_{aver.}$=0.2623 sq. cm./min.).

The "slopes" of the heating and cooling curves, f_h and f_c, are significantly different and cannot be used interchangeably. The visual estimates of these "slopes" are significantly different from their regression estimates and should not be used in process determination.

In addition, the experimental findings in this study confirm trends observed in (4) and indicate that processing temperatures between 261-279° F. display the characteristics of a critical range where most of the physical characteristics assume their extremes. This temperature range may prove to be optimal for canning of safe and palatable beef.

Part VII. Residual Heating Effects in Beef Processed at High Retort Temperatures

In the course of the investigation of the intermediate cooling period and residual heating effects a

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 Authors' Summaries

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method has been developed to determine effective retort holding times. This method may result in shorter but safe processing times and may increase the palability of canned beef and other products.

On the basis of the experimental results the following conclusions may be drawn:

Neither the theoretical solution of the heat conduction equation nor a monotonic function approximate the experimental results for the intermediate cooling phase.

The residual heating at the beginning of the cooling phase increases the effective processing time.' This increase is most pronounced for short time, high temperature processes. The contribution of residual heating to the sterilizing effect displays the same trend and possibly reaches maximum at 297° F. retort temperature.

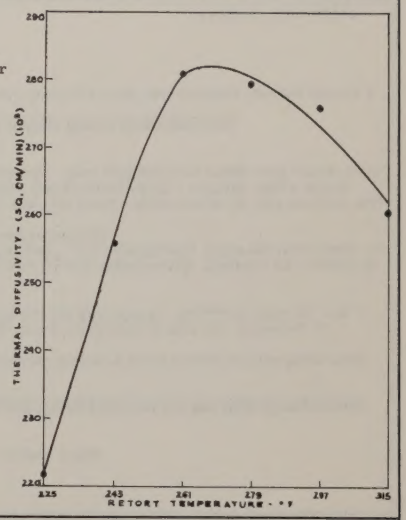

Figure 1. Relationship of thermal diffusivity of beef and retort temperature

2.15 (Cross Reference: 2.118)

not acceptable because of unsuitable salting qualities. The continuous freezer on the trawler Louis Legasse has a maximum capacity of 5.4 tons per 24 hours. The fish are frozen from six sides in finned metal molds.

The Torry Research Station in Aberdeen has reported on vertical plate freezers for use aboard ship. Vertical plates are simpler to operate than horizontal ones for the freezing of gutted groundfish. Better thermal contact is obtained with vertical plates than with horizontal plates. This type of equipment is being adapted to the British trawler Northern Wave which has a 5.4-ton per 24-hour freezing capacity. Eventually, it is hoped to land a portion of a British trawler's catch as frozen, gutted fish and the remainder as iced fish.

It is interesting to note that the British factoryship trawler Fairtry, with a freezing capacity of 40 tons per day and a storage capacity of 600 tons of packaged fish, has had its inception in a country where the demand for frozen fish is small and where cold-storage facilities on a retail level are lacking at present.

Shrimp.--Various investigators have found that the chilling of shrimp in sea water is preferred to the use of ice because of the prevention of "blackspotting," a phenomenon attributed to an oxidative enzyme system.

Various methods of immersion freezing of shrimp have been investigated. A method developed by Dassow involves chilling in ice water and then freezing in a 22-percent brine held at 5° F. The water glaze formed on the shrimp virtually stops salt penetration.

Although the chilling and freezing of shrimp in sea water and in brine is technically desirable, ice preservation is still largely employed.

Salmon.--Based upon the Pacific Fisheries Experimental Station work on chilling salmon in sea water refrigerated to 28° F., various commercial installations of this method are now being tested. The main advantages claimed for this method are the elimination of the labor of icing fish, the physical damage to the fish by the ice, and the suitability of this method to the application of antibiotics.

Fresh fillet chilling.--The concept of prechilling and the use of metal fillet containers (example, the Canadian National Railway patented Canex container) for fresh fillet shipments are being strongly pushed in Canada.

2.9 (Cross Reference: 7.599)

2. A second procedure is given for using the reference standard with routine assays of shellfish products.

3. A complete procedure for the bioassay of clams or mussels for shellfish poison is described and a table and reporting form for use with this procedure are included.

For complete information concerning the plan, requests should be directed to the Public Health Service, Washington 25, D. C., Attention: Shellfish Sanitation Section. Requests from Canadian laboratories can be considered only when endorsed by the Food and Drug Directorate, Department of National Health and Welfare, Ottawa, Canada.

3.23 REFRIGERATION OF FISH - PART 4. PREPARATION, FREEZING, AND COLD STORAGE OF FISH, SHELLFISH, AND PRECOOKED FISHERY PRODUCTS

Dassow, John A.; Pottinger, S. R.; and Holston, John
Fishery Leaflet 430, 1-124 (1956) Fish and Wildlife Service, United States Department of the Interior, Washington 25, D. C.

Freezing as a form of preservation dates back to the time when man first occupied the northern and Arctic regions of the world. Fish taken through the ice of northern waters in the winter froze hard and were preserved until they thawed. Although natural freezing of fish is still employed for winter commercial fisheries in some of the northern fresh-water fisheries, most frozen fish are now preserved by mechanical refrigeration.

Section 1 deals with the preparation, freezing and storage of fish under the two following major headings: (1) freezing fish at shore plants, and (2) freezing fish at sea.

Section 2 covers the preparation, freezing and storage of shellfish under the following major headings: oysters, shrimp, lobster, crabs, scallops, abalone, and clams.

Section 3 discusses the preparation, freezing and storage of raw, breaded, and precooked fish and shellfish under the following major headings: breaded precooked fish sticks; breaded, "portion control" fish squares; breaded, raw or precooked fillets or bite-size portions of fish; breaded raw or precooked shrimp; frozen fish soups and chowders; and other specialty seafood items.

See illustrations, over.

(over)

 ABSTRACTER: Kathryn L. Osterhaug

3.238 VACUUM-PACK FOODS IN "BOIL-IN-THE-BAG" PACKAGES

Anonymous
Food Processing 17, 72-73, 80 (May 1956)

Transparent polyester-polyethylene bags can now be vacuum packed. This added convenience will increase the number of products that can be packaged in "boil-in-the-bag" pouches. At present the bags, without the vacuumizing feature, are being used to package prepared frozen foods in single-portion sizes.

A New Jersey testing laboratory found that shrimp and corn-on-the-cob were rated high by observers when packaged in the new vacuumized plastic bags.

All flavors, odor and food juices are retained in the food when it is heated in the package and served from there when hot.

Other foods that have been successfully packed in the polyester laminate bag include soups, sauces, fish, creamed mushrooms, gravies, and chicken-a-la-king. Most of these are sealed without vacuum. Corn-on-the-cob, sausage, carrots, frankfurters, and scallops can be vacuum-packed to advantage.

The vacuum package completely submerges in the cooking water, guards against moisture loss from the product during both freezing and cooking, and by eliminating air, promotes faster freezing of the product.

The package can withstand boiling for eight hours and will stand up in storage from a -80° F.

(over)

 ABSTRACTER: Kathryn L. Osterhaug

3.231 PACKAGING FREEZERS

Anonymous
Food Manufacture 31, 161 (April 1, 1956)

A new packaged food freezer, available in two sizes, both of which use ammonia as a refrigerant, was recently developed by a New York corporation. The freezer consists of a frame, refrigerated plates, manual controls, refrigerant hoses, hoist, loader, and electrical controls. The freezer is entirely automatic and requires only one operator for the loading, freezing, and unloading of packaged foods.

Packages to be frozen are conveyor-carried into a loading position. Release of a push-button control automatically sends the packages into the freezer and pushes them onto a freezer plate. As this plate is being filled a mechanical counter indexes the freezer to the next loading station or plate. Succeeding rows of packages enter the freezer and move into position automatically. When the last station or plate has been filled an elevator is lowered to the bottom of the freezer. The operator must then reset the machine to the first loading position. As the automatic loader pushes a new row of packages onto the plate, a row of frozen packages drops off the back of this plate. These packages are then conveyed to storage.

The advantages of the freezer are: (1) a low operating cost that is obtained by automatic loading and unloading and (2) continuous operation, that is obtained by freezing the packaged product in contact with the plate without interruption of the loading and unloading cycle.

See illustration, over.

(over)

 ABSTRACTER: Martin Heerdt

6.3 STUDIES ON THE MANUFACTURE OF ALGIN FROM BROWN ALGAE

Suzuki, Noboru (Faculty of Fisheries, Hokkaido University, Japan)
Memoirs of the Faculty of Fisheries Hokkaido University 3, 93-158 (1955)

I. Chemical studies on raw materials of algin manufacture
   1. Occurrence of algin in brown algae
   2. Chemical components of brown algae
   3. Seasonal variation of chemical components

II. Mechanism of algin manufacture
   1. Dissolution of free alginic acid
   2. Dissolution of calcium alginate
   3. General theory concerning the process of algin manufacture

III. New recommended processes for algin manufacture
   1. Algin manufacture from brown algae macerated with sodium sulfite
   2. Algin manufacture from brown algae macerated with sodium chloride and sodium carbonate (Suzuki's method)

IV. Studies on pretreatment of algae
   1. Experimental
   2. Discussion

V. Recovery of mannit from brown algae
   1. Experimental

(over)

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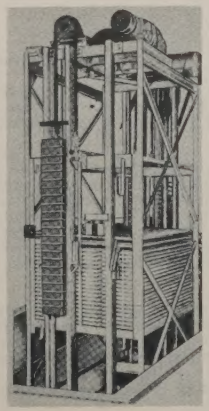
REFRIGERATION OF FISH

PACKAGED FOOD FREEZER

VACUUMIZED BAGS FOR FREEZING

MANUFACTURE OF ALGIN

3.231



Automatic package freezer

3.23 (Cross Reference: 3.235, 3.236, 3.237, 3.238)

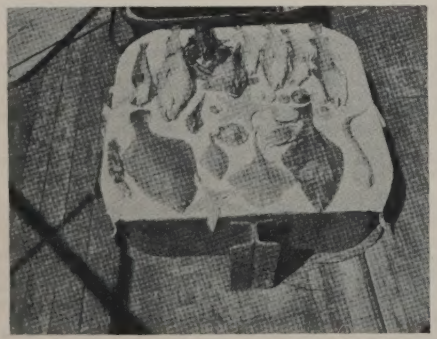


Figure 4.—Various species of fish and bottom life caught by trawl off the New England coast. From left to right—top—whiting, hake, lobster, puffer, scrod haddock, haddock, scrod cod, and cod—middle—sculpin, hermit crab, starfish, periwinkles, quahog clams, crab, and scallops—bottom—squid, lemon sole, dab, starfish, skate, halibut, and ocean pout.

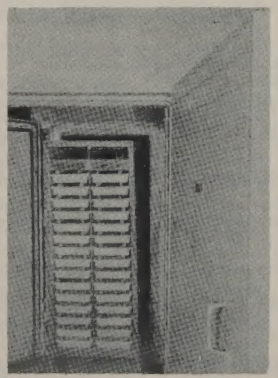


Figure 10.—Loading a blast freezer. The fish fillets are frozen in the aluminum pans with lids.

6.3

2. Discussion

VI. Studies on the process of manufacturing algin
1. Temperature of algin treatment
2. Maceration of algae
3. Process of filtration of macerated liquor
4. Gelling of alginic acid
5. Drying of algin

VII. Conclusions

VIII. Literature (38 references cited)

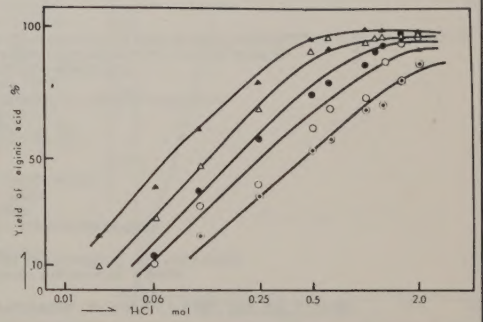


Fig. 61. Yield of alginic acid by gelling with HCl from sodium alginate solution.

Percent gelled from sodium alginate solution 0.3 ▲, 0.4 △, 0.5 ●, 0.6 ○, 0.7 ◉

3.238

temperature to above 212° F.

3.4 NEW GENERATOR PRODUCES SMOKE BY FRICTION

Anonymous
The National Provisioner 134, 8-9, 21 (April 28, 1956)

A revolutionary new smoke generator has been developed that gives a uniform smoke density with a reduction of unwanted tars and soot. The new generator, started and stopped by the touch of a button, operates on the principle of controlled friction of a wood block against a spinning disc. Three units have been in operation for eight months with satisfactory results.

Essentially the device is a high-speed horizontal friction disc driven by a five-horsepower motor. The disc is mounted in a horizontal plane at the bottom of a cabinet. Guides at the bottom and at the top hold the vertical hardwood block in place. The log is stood on end with the lower end held in place on the disc by the lower guides. The upper end is positioned by a floating header that can be loaded with weights. Smoke production is varied by the weights applied. Smoke density is measured by a Bailey densitometer that measures the degree of opacity. Once production is started, smoke will remain constant for hours. Production of smoke may be started or stopped at any time at will. A smoke density that can be detected by the densitometer can be produced in 30 seconds, a density of 100 percent in 15 minutes. The supply of hardwood blocks was assured by using hardwood cores discarded as waste by hardwood furniture plants in Chicago. To eliminate soot, the sides of the cabinet are constantly drenched by running water. Smoke is filtered and washed before entering the smoke house thus eliminating unwanted tars. Color retention has been improved under the new method of smoke production.

Consumer reaction was tested by the United Butchers Packing Co., of Chicago. A three-months test determined that there was no unfavorable reaction on the part of consumers to products produced

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ABSTRACTER: Lynne McKee

3.5 FURTHER STUDIES ON THE RED HALOPHILIC BACTERIA FROM SOLAR SALTS AND SALTED FISH

Venkataraman, R. and Sreenivasan, A. (Fisheries Technological Station, Kozhikode, India)
Proceedings of the Indian Academy of Sciences 43B, 197-206 (March 1956)

Red halophilic bacteria that cause the reddening of salted fish were isolated from a number of samples of sodium chloride salts from India, and from Indian salted fish. Growth of these bacteria was good in a modified salt-milk-agar.

The authors classified a number of the red halophiles on the basis of their morphological and cultural characteristics and their reactions in various media. Four new rod-shaped species were described and named. Two of these, Halobacterium indicum and Halobacterium minutum did not show any versatile physiological reactions in the usual diagnostic media, but they grew well and produced "spoilage odors" and ammonia in a prawn infusion starch-salt medium. Halobacterium gibbonsii, however, did show high proteolytic tendencies by rapidly digesting casein and liquefying gelatin. Halobacterium cutirubrum, a proteolytic species, also was isolated from salted fish. None of the new rod shaped species produced indole or H_2S.

A number of red halophilic cocci also were examined. These resembled Micrococcus morrhuae or Sarcina littoralis but could not be readily fitted into these classifications because of slight differences. Some of these cocci, which were more reactive on laboratory media than the rod forms described, hydrolyzed gelatin, digested casein, hydrolyzed starch, and even produced indole. Most of them, however, were unable to develop in media containing less than 10 percent salt.

Taxonomically, the authors propose that the rod forms of the red halophilic bacteria be included

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ABSTRACTER: Martin Heerdt

3.5 THE RED HALOPHILIC BACTERIAL CONTENT OF SOME COMMON SALTS

Venkataraman, R. and Sreenivasan, A. (Fisheries Technological Station, Kozhikode, India)
Journal of the Scientific and Industrial Research 14B, 606-607 (November 1955) (Reprinted)

The red halophilic bacterial content of samples of salts obtained from different parts of India was determined by the "drop-plate" method on a modified salt-milk-agar medium. The chemical composition of the salts was also determined. Mined (rock) salts did not contain any red halophilic bacteria, whereas most of the solar evaporated salts did contain red halophiles. East Coast solar salts from Tuticorin, Nagercoil, Bedaranyam, Adirampatnam, Markanam, Ganjam, and Vizag contained a large number of these bacteria. Except for 2 samples which contained very low numbers of halophiles, Sambhar Lake salts usually did not contain red halophilic bacteria. Tata chemicals salt from Mithapur likewise contained very few halophiles, and 2 samples of Wadala salt did not contain any halophiles.

A correlation was found to exist between the numbers of red halophiles and the magnesium content of the various salts. Salts with a low magnesium content, or no magnesium at all, contained either no red halophiles or only a few, whereas salts with a high magnesium content contained many red halophiles. Most of the salts examined were of standard quality and contained 94 to 95 percent sodium chloride. Some of these salts were high in magnesium and calcium content which had an adverse action on the curing process and which also encouraged the growth of red halophilic bacteria on salted products.

ABSTRACTER: Martin Heerdt

6.4 FISH OILS IN SPRAYS FOR CITRUS TREES

Anonymous
Commercial Fisheries Review 18, 9 (March 1956)

Various fish-oil formulations as fungicides in spraying citrus trees are being tested at Florida Southern College, Lakeland, by Drs. Boris Sokoloff and Isador Chamelin working on a U. S. Fish and Wildlife Service contract with funds provided by the Saltonstall-Kennedy Act.

An unexpected development was the effectiveness of their material as a control of a nematode (a round worm) infecting citrus trees in laboratory experiments. Nematodes are a serious menace to citrus growers in Florida. The intense local interest by orchard men to a preliminary statement of the findings at a local scientific meeting led to some unwarranted optimistic newspaper interpretations of this report.

Although convinced that their formulations may prove of considerable value, these investigators wish to re-emphasize that a large amount of field testing will be required to properly evaluate those formulae found effective in the laboratory tests. In the case of nematode control, this may be time-consuming since the nematodes are found widely and deeply distributed in the soil, and conditions of the application and possible toxicity to trees will have to be studied very carefully.

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SMOKE BY FRICTION

RED HALOPHILES IN SALT

RED HALOPHILES IN SALT

FISH OILS IN FUNGICIDES

3.5 (Cross Reference: 0.5)

6.4

3.4

by the new method. The overall cost of smoked products is said to be less due to savings in labor and ease of control. Also considerable room is saved as no large sawdust storage space is needed and fire hazards are less. Two logs per day per smoke house unit are sufficient to maintain production.

3.5 (Cross Reference: 0.5)

in the new genus Halobacterium in the family Pseudomonadaceae. It is believed that gram-negative, obligately halophilic rods possessing red (carotenoid) chromogens may belong to this genus. Since flagella staining of these halophilic bacteria is difficult, and since non-motile forms also exist, flagellation is not recommended as a criterion for excluding these forms of halophilic bacteria from the Pseudomonadaceae.

The authors recommended washing the fish salting rooms and equipment with fresh hot water as a means of eliminating red halophilic bacterial contamination from fish salting plants.

3.5 A NEW AUTOMATIC SALT-FISH WASHER

MacCallum, W. A. (Atlantic Fisheries Experimental Station, Halifax, N. S.)
Fisheries Research Board of Canada, Progress Reports of the Atlantic Coast Stations, No. 62, 38-41 (July 1955)

A new patented automatic salt-fish washer designed by the Atlantic Station is shown in figure 1. This machine effectively scrubs the fish on both sides while flexing them to loosen dirt and spraying them with water to wash the dirt away. Counter rotating brushes are used. These brushes provide definite reversed-curve paths for the fish to travel through the machine.

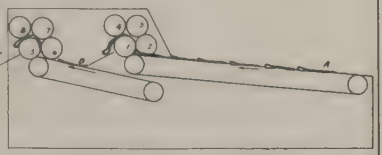

Figure 1. Schematic drawing of conveyor belt and brush arrangement in the new Automatic Salt-Fish Washer as seen from one side of the machine.

The washer requires a floor area of 3 feet 6 inches by 15 feet and a ceiling height of less then 8 feet.

Operation.--Fish are placed on a conveyor belt at A (figure 1) by 1 to 3 employees who feed the belt from either side or from behind the conveyor roller. Dirt on the fish is soaked under a spray of water (pre-washing) while the fish are on the conveyor belt. Salt on re-salted fish also can be effectively loosened under this spray of water. The pre-washed fish then move automatically from the belt to the brushes and travel between brushes 1 and 2, 1 and 3, and 1 and 4, respectively, and leave the first set of brushes to fall on a second conveyor belt at B. Again the fish move automatically from belt B to the second set of brushes, travel between brushes 5 and 6, 5 and 7, and 5 and 8, leave the brushes, and

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 ABSTRACTER: Martin Heerdt

4.99 STUDIES ON ENCEPHALOMALACIA IN THE CHICK
5. THE EFFECT OF FISH OIL AND DIPHENYL-P-PHENYLENEDIAMINE ON THE VITAMIN E METABOLISM OF THE CHICK

Bunnell, R. H.; Matterson, L. D.; Singsen, E. P.; and Eaton, H. D. (University of Connecticut, Storrs, Connecticut)
Poultry Science 35, 436-451 (March 1956)

Introduction.--The exact role of antioxidants such as methylene blue and diphenyl-p-phenylenediamine (DPPD) in the sparing of vitamin E for metabolism still remains to be determined.

Purpose.--To clarify the mechanism of the action of unsaturated fats and the antioxidant DPPD on the vitamin E metabolism of the chick, the authors planned an experiment that would adequately measure the actions and interactions of the factors that affect growth, plasma tocopherol, and the lipid and tocopherol content of the liver of the chick.

Experimental plan.--The authors chose an experimental plan that would test the effects of vitamin E, DPPD, and fish oil on the vitamin E metabolism of chicks from dams "normal" and deficient with respect to vitamin E. The plan which was formed to obtain the needed information with a minimum of effort, was of factorial design to determine main effects as well as interactions among the experimental variables.

Results.--An analysis of the data collected from this study indicates results as follows:

1. The amount of tocopherol stored in the livers of day-old "normal" chicks was as much as 10 times greater than the amount of tocopherol stored in the livers of day-old vitamin E-deficient chicks.

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 ABSTRACTER: Martin Heerdt

4.92 TOXICITY OF FATTY PEROXIDES

Anonymous
Nutrition Reviews 14, 122-123 (April 1956)

Kaneda, Sakai, and Ishii (1955) recently reported the results of experiments planned to identify the toxic agent in overheated or rancid fat. They fed peroxidized fatty acid ester in doses of 0.2- to 0.5-grams per day for a period of 30 days to rats on a low fat diet. The fatty acid esters fed came from linseed fatty acids or from the highly unsaturated fatty acids of fish oils, and were peroxidized by heating in air before they were fed.

Two methods used to separate the peroxidized esters from other products of the aeration were (1) absorption on an alumina column, which removed the toxic products from the aerated highly unsaturated fatty esters of fish oil and (2) urea fractionation. The fraction that formed the urea adduct (unchanged starting material aldehydes, low polymers, etc.) was fed for 20 days without causing symptoms of toxicity. In contrast, the fraction (peroxide value of 1200 to 1600) that did not form a urea adduct killed the animals to which it was fed in a period of 2 days.

Interpretation of the findings in several ways was still possible since the high peroxide fractions also contained polymerized products and conjugated fatty acid derivatives. Rats grew normally and without ill effect when fed polymerized esters of highly unsaturated fatty acids prepared by heating at 120° C. in an atmosphere of carbon dioxide. Conjugated fatty esters prepared from tung oil likewise were completely non-toxic to rats. When highly toxic peroxidized fatty acid esters were reduced with potassium iodide, the reduction products were non-toxic and supported some growth at the level fed. Even if the reduced peroxidized esters were of poor nutritional quality, the evidence obtained shows that the toxic factor which had induced death in 2 days was the peroxide.

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 ABSTRACTER: Martin Heerdt

6.82 POTENTIAL INDUSTRY FROM LOBSTER SHELLS

Anonymous
Fishing Gazette 73, 96 (March 1956)

A potential million-dollar industry for the Maritimes by the utilization of lobster shells for the manufacture of a rayon-like material is foreseen as a possibility by Dr. Henri Fougere of Halifax, director of the Atlantic Technological Station of the Fisheries Research Board.

Dr. Fougere's announcement was made as district protection and inspection officers gathered in Halifax for the general session of the annual Maritimes Area conference of the Federal Department of Fisheries.

From the lobster shell it is possible to extract a substance called "chitin" from which can be manufactured fibres which can be processed into a rayon-like material with water-repellent properties, Dr. Fougere told the meeting.

Other speakers at the meeting included J. J. Lamb of Ottawa, Director of the Department's administrative service; E. Blyth Young of Ottawa, assistant chief protection officer for the Department; and Dr. J. L. Hart, director of the Atlantic Biological Station at St. Andrews, N. B.

Chairman of the conference was Loran E. Baker, Chief Supervisor of the Department for the Maritimes Area.

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SALTED FISH WASHER

TOXICITY OF FAT PEROXIDES

CHICK ENCEPHALOMALACIA

FIBRES FROM LOBSTER SHELL

4.92

An examination of symptoms of peroxide poisoning showed that the liver and muscle fat of animals receiving high peroxide fats were themselves peroxidized. This finding was interpreted as evidence that peroxide was actually absorbed through the intestinal wall and deposited in the body. The work of Granados, Aaes-Jorgensen, and Dam (1949), however, indicates that vitamins can be oxidized in the gut by peroxide.

The rats that were fed by Kaneda et al. received only 3 milligrams of tocopherol per 100 grams of food or an amount that could easily have been destroyed. Destruction of the tocopherol could give rise to peroxidized body fat and other symptoms such as kidney damage, but not to the rapid death that occurred. Kaneda et al. believe that a possible action of peroxides; if they can gain entrance to the body, is the destruction of the liver mitochondria which would decrease many vital enzymes. Liver mitochondria were actually destroyed in vitro by peroxides, however, proof would be required to show that peroxides themselves can be absorbed by the body and can produce direct damage.

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slide down a guide into a waiting receptacle or onto a third conveyor belt.

Mechanical design.--The two geared motors, which develop 1 and 3 horsepower, respectively, and the sprockets, chains, spur gears, and bearings used to make the washer are stock items. Water at about 5 pounds per square inch gauge pressure and at the rate of 25 to 30 gallons per minute is required for the presoaking operation. Brushes made with nylon bristles showed some wear after being in service on the washer for one year, but should last for at least 2 years. Vegetable fibre bristles in service on the washer were worn out after a few months.

A washer of the design indicated in figure 1, costs about $3,650 to construct and install in Nova Scotia. This price includes an aluminum alloy frame, a short conveyor for prewashing, corrosion-resistant monel shafts, water pipe installed, and electric wires installed with separate magnetic switches for the motors. By comparison, a 2-brush hand-manipulated fish washer of steel construction and equipped with fibre brushes costs $2,000.

Production comparison.--Five employees with the aid of the new washer can soak and wash 30,000 pounds of salt fish in 8 hours, or a per man-hour production of $30,000 \div 40 = 750$ pounds. By comparison 7 employees in the same plant with the aid of a 2-brush hand-manipulated washer can soak and wash 15,000 pounds in 8 hours or a per man-hour production of $15,000 \div 56 = 270$ pounds.

4.99 (Cross Reference: 5.7)

These values became equal after both lots of chicks had been on the same diet for 10 to 15 days. However, the normal chicks showed better growth during this period.

2. Adding vitamin E to the diets of both groups of chicks increased the tocopherol levels of their blood plasma and liver, but did not cause a significant mean response in growth. The "normal" chicks, however, did show some growth response.

3. DPPD did not show an overall effect on the tocopherol levels of the blood plasma or liver of both groups of chicks, but tocopherol levels in the liver of the vitamin E-deficient chicks were somewhat increased. DPPD also stimulated growth--particularly of the vitamin E-deficient chicks--, increased the lipid content of the liver, and overcame a part of the growth depression that resulted from feeding fish oil.

4. Fish oil as a part of the diet of the chicks depressed the tocopherol levels of the blood plasma and the liver, depressed growth, and decreased the lipid content of the liver.

5. The authors proposed, as a result of this study, that DPPD may influence the metabolism of unsaturated fatty acids in such a manner as to increase their catabolism in the liver, thereby bringing about a possible decrease in the degree of unsaturation of the tissue lipids. This premise, if true, explains the protective action of DPPD against encephalomalacia, since only minimal amounts of vitamin E are then necessary for the protection of the tissues.

6.190 THE NUTRITIVE VALUE OF FISH PROTEINS

Miller, D. S. (The Crookes Laboratories Ltd., London, N. W. 10)
Journal of the Science of Food and Agriculture 7, 337-343 (May 1956)

Suggestions have been made that white fish meal should be used to supplement human diets. During the war, fish proteins were used as a substitute for egg albumin. Recently a trial was undertaken in Chile on the acceptability of deodorized fish flour incorporated in biscuits. Deodorized products, however, are apparently not palatable, and further trials are being undertaken with ordinary fish meals.

Many growth tests have been made on fish meals, but only a small number of nitrogen-balance studies have been carried out. These show, for net protein utilization, a range of values of 41 to 85 percent for oily fish and of 60 to 90 percent for white fish. During the 1930's, a number of comparisons were made of products taken from various types of driers. These comparisons showed that the nutritive value of vacuum-dried meals was superior to that of steam-dried meals and that the nutritive value of steam-dried meals, in turn, was superior to that of flame-dried meals. Recent tests, however, have shown little to choose between the three methods of drying, and although this conclusion is disputed by some authorities, it may well be a reflection of improved techniques in the industry.

Experimental.--The method employed by the author is both shorter and less laborious than is the classical method of determining the biological value of proteins. This method gives net protein utilization (N. P. U.), the product of biological value and digestibility, which is that portion of the intake nitrogen retained by the animal and is normally expressed as a percentage. This value can be derived from body nitrogen determinations as follows:

$$N.P.U. = [B-(B_k-I_k)]/I,$$

(over)

 ABSTRACTER: F. Bruce Sanford

6.193 EVIDENCE FOR A SUBSTANCE IN FISH SOLUBLES WHICH ENHANCES VITAMIN A STORAGE IN CHICK LIVERS

Harms, R. H.; Camp, A. A.; Reid, B. L.; Grant, E. L.; Creech, B. G.; and Couch, J. R. (Texas A. and M. College System, College Station, Texas)
Poultry Science 35, 285-291 (March 1956)

Introduction.--Condensed fish solubles are known to increase the growth rate of chicks; therefore the authors desired to determine the effect of solubles on the storage of vitamin A in chick livers.

Experimental.--Straight run New Hampshire chicks and Single Comb White Leghorn chicks were used, respectively, in experiments 1 to 9 and 10 and 11. All of the chicks were from dams that were maintained on a complete breeder diet. All of the chicks were maintained on raised screen floors in electrically heated batteries and supplied ad libitum with feed and water.

Their basal ration contained 66.5 percent ground milo, 29.0 percent soybean oil meal (44 percent protein), 2 percent dicalcium phosphate, 1.5 percent ground oyster shell, 0.5 percent sodium chloride. The basal ration was fortified on a per pound basis with 2 milligrams (mg.) riboflavin, 5 mg. calcium pantothenate, 12.5 mg. niacin, 400 mg. choline chloride, 3 micrograms vitamin B_{12}, 1 mg. penicillin, 2.5 mg. bacitracin, 0.08 grams $MnSO_4$ and 600 international chick units of vitamin D_3. The feed was mixed on the day the experiment began. A second batch of feed was mixed at the end of the first 5 weeks.

The vitamin A fed in these studies was either a fish oil concentrate or a dry stabilized vitamin A concentrate each with a potency of 10,000 international units of vitamin A per gram at the time the vitamin was added to the feed. Vitamin A was fed as a supplement to the ration at either the 2000 or

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 ABSTRACTER: Martin Heerdt

6.190 CHICK GROWTH RESPONSE TO CONDENSED FISH SOLUBLES AND VARYING LEVELS OF TERRAMYCIN

Wisman, E. L.; Holmes, C. E.; and Engle, R. W. (Virginia Agricultural Experiment Station, Blacksburg, Virginia)
Poultry Science 35, 457-462 (March 1956)

Introduction.--Significant growth responses with low levels of antibiotics have not been obtained at the Virginia Agricultural Experiment Station.

Purpose.--This study was made to determine if a growth response could be obtained by using higher levels of antibiotic under various dietary and environmental conditions.

Experimental.--Day-old white Leghorn cockerels were raised in wire-floored electrically heated batteries. Twenty-two chicks randomly selected, were started in each treatment group, but data for only 20 was used. Individual weight gains were measured weekly to 4 weeks of age and analyzed statistically. The percentage composition of the basal diet was as follows: ground yellow corn 47.375; soybean oil meal (solv.) 30.0; wheat flour mids. 10.0; pulverized oats 5.0; alfalfa meal (dehyd.) 3.5; rock phosphate defluor. 1.75; ground limestone 1.5; iodized salt 0.5; choline cl. (25 percent dry) 0.2; Merck's 58A vitamin mixture 0.1; Nopco's Viadex A-D mixture 0.05; manganese sulfate (80 percent) 0.025; and 5 micrograms of crystalline vitamin B_{12} per pound of diet. Condensed fish solubles (50 percent solids) was added to 1/2 of the diets to replace 5 percent of the soybean oil meal. Antibiotics were added as shown in the tables (see over). Feed and water were given ad libitum.

The design of experiments 1 and 2 and the average gains and feed efficiencies are shown in tables 2, over and 3, omitted. Trial A (10 groups of 20 chicks each) was conducted on wire floors. Trial B was

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 ABSTRACTER: Martin Heerdt

7.779 DIFFERENTIATION OF VARIETIES AND SPECIES OF MARINE FISH WITH THE HELP OF CHROMATOGRAPHIC SEPARATION

Dannevig, E. H. (State Fish Hatchery, Flodevigen, Norway)
Tidssk. Hermetikind. 41, 121-3 (1955)
Chemical Abstracts 49, 7763 (June 10, 1955)

About 2 cubic mm. of the muscle is taken from the dorso-lateral muscle in the neck of the fish. The piece of muscle is crushed against the filter paper and the dry fibers are quickly scraped off. When the spot has dried, the paper is extd. in the chromatograph vessel. The soln. used is either: (1) BuOH, glacial AcOH and water (4:1:5); (2) phenol and water (8:2); or (3) PrOH and 1% NH_4OH (2:1). Soln. (1) gives the best characteristic pattern. The paper is allowed to dry and the pattern is developed with ninhydrin. One should also det. the pattern under ultraviolet light. The chromatographic pattern was developed for 23 different varieties of marine fish of which 10 belong to the cod family, 3 different herring, and 4 different flounder. The various species showed chromatographically different patterns while the fish from the same species showed the same pattern irrespective of age or sex. The method seems to have a very high degree of specificity. The arrangement of the spots do not change. In some cases it has apparently been possible to differentiate between physiol. varieties such as deep- and shallow-water cod. The products that det. the pattern of the chromatographic distribution appear to be of genetic origin rather than environmental.

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NET PROTEIN UTILIZATION FACTOR

FISH SOLUBLES FOR CHICKS

VITAMIN A UTILIZATION

CHROMATOGRAPHIC SEPARATION OF SPECIES

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conducted on dropping papers containing the last 3 days droppings from trial A.

Results.--Low and high levels of terramycin failed to stimulate the growth of chicks raised in batteries on a vegetable-protein diet. If 5 percent fish solubles was included in the diet, high levels but not low levels of terramycin significantly increased growth to 4 weeks of age. Five percent fish solubles alone as an inclusion in the diet also increased growth. Battery location in old versus new quarters or the absence or presence of droppings in the pens in old quarters did not alter the responses significantly.

Table 2.--Effect of fish solubles, antibiotic level and cleanliness of quarters on growth and feed efficiency

(Experiment 1, 20 chicks per treatment)

Term HCl,[1] per lb.	Trial A (droppings absent)		Trial B (droppings present)		Trials A and B	
	0-4 weeks of age					
	Av. gain, gm.	Units feed/unit gain	Av. gain, gm.	Units feed/unit gain	Av. gain, gm.	
	Non-animal protein					
0	316	2.10	315	2.29	316[c]	
10	327	2.05	321	2.11	324[c]	
50	322	2.18	316	2.20	319[c]	
100	332	2.13	324	2.01	328[c]	
200	323	2.13	328	2.01	326[c]	
	5% condensed fish solubles					
0	357	2.00	353	2.23	356[c]	
10	333	2.10	327	2.12	330[c]	
50	335	2.06	339	2.08	337[c]	
100	340	2.00	343	2.04	340[c]	
200	364	2.01	358	2.10	361[c]	

[1] Crystalline terramycin hydrochloride

[c] Values followed by the same superscript are not significantly different from each other at the 5% level by the multiple range test. The test was applied separately to the no animal protein and condensed fish solubles means.

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where B and B_k are total body nitrogen, and I and I_k are intake nitrogen, of the animals on test and nonprotein diets, respectively.

The ideal would be a measurement of the body nitrogen of the same rat both fed the test protein and starved of protein. This arrangement is impossible, of course, but the equivalent can be achieved by use of control groups. In practice, then, four litters of eight rats are arranged in eight groups of four rats so that each group contains one rat from each litter and each group has the same total weight. Seven of these groups are fed test diets, and one group is fed a nonprotein diet. At the end of 10 days, the animals are killed, and body nitrogen is determined by Kjeldahl digestion of the whole carcass, or alternatively from a relationship between the carcass N/H_2O ratio and age, which is independent of diet. This relation is:

$$\log (4.8-y)=0.437-0.0123x$$

where $y=N/H_2O$ percent and X=age in days. Thus, at the end of the feeding period, the animals are killed; incisions are made into the skull, thoracic, and body cavities; and a determination is made of dry weight. From the age of the rat and its body-water content, one can calculate the body nitrogen and, by substitution in the previous equation, N.P.U. can be determined.

Conclusions.--The protein quality of commercial fish meals is impaired to a variable extent during the drying process. This impairment is due to the action of heat in the presence of moisture and is the result of the Maillard reaction. Since moisture is inevitably present in the fish body, the damage during processing can be minimized only by low-temperature drying, unless some anti-Maillard substance can be found. The N.P.U. could, however, be raised by the addition of a small percentage of methionine, but the optimum amount, practicability, and economics of such additions must await field trials. On storage, fish meals retain their feeding value for at least 3 months.

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the 4000 unit level. Condensed fish solubles were fed as a supplement to the ration at either the 3 or 5 percent levels. At the 3 percent level they supplied an additional 800 units of vitamin A per pound of feed.

Each experiment was ended after 3 to 10 weeks, and a random sample of chicks (equal numbers of each sex) were killed and their livers removed, wrapped in aluminum foil, and placed in storage at -14° C. Vitamin A assays of the livers were made according to the method of Moore (1930) or that of Risley and Ames (1954)--which is the antimony trichoride reaction.

Results.--Typical results are shown in table 1. Supplementation of the rations with fish solubles increased vitamin A storage in the livers from 3, 4, 9, and 10 week old chicks considerably. The unidentified factor (s) in fish solubles that increased the storage of vitamin A in the liver was found to be water soluble. Chemical determination showed that the vitamin A in fish solubles was very low in biological activity.

Table 1.--Average body weight and vitamin A content of livers from New Hampshire chicks at ten weeks of age when fed different sources of vitamin A and supplemented with fish solubles

Experiment number	I U vitamin A added per lb. of feed	Source	Supplements to basal diet	Average weight at 10 wks (grams)	Liver vitamin A content	
					I U per gram	I U per liver
	Six livers analyzed per group					
1 (6-19-53)[1]	2,000	F. O.[2]	None	501	4.16	55.6
	2,000	F. O.[2]	F. S.[4]	1,055	10.30	217.3
	2,000	S. A.[3]	None	858	14.6	279.4
	2,000	S. A.[3]	F. S.[4]	963	61.33	1282.0[5]
	4,000	F. O.[2]	None	691	2.33	42.7
	4,000	F. O.[2]	F. S.[4]	943	96.50	1957.0[5]
	4,000	S. A.[3]	None	806	119.25	2393.0
	4,000	S. A.[3]	F. S.[4]	952	153.66	3821.0
2 (10-23-53)[1]	4,000	F. O.[2]	None	1,088	18.17	493.0
	4,000	F. O.[2]	F. S.[4]	1,246	183.52	5084.0[5]
	4,000	S. A.[3]	None	1,102	141.73	3073.0
	4,000	S. A.[3]	F. S.[4]	1,251	187.41	5099.0[5]
3 (12-5-54)[1]	4,000	F. O.[2]	None	968	113.0	2038.0
	4,000	F. O.[2]	F. S.[4]	1,126	206.0	3816.0[5]
	4,000	S. A.[3]	None	1,126	184.0	3369.0
	4,000	S. A.[3]	F. S.[4]	1,118	204.0	4393.0

[1] Beginning date of experiment

[2] Fish oil concentrate

[3] Stabilized vitamin A concentrate

[4] Three percent condensed fish solubles.

[5] Significant at the 0.01 level of probability.

6.193 SUMMARY OF INFORMATION ON UNIDENTIFIED GROWTH FACTORS--ECONOMIC EVALUATION

Couch, J. R. (Texas A. and M. College)
Feedstuffs 28, 30-32, 34 (April 28, 1956)

Four unidentified growth factors are at present recognized: (1) whey factor, (2) fish factor, (3) alfalfa factor, and (4) inorganic chick growth factor. The requirements for these various factors apparently is greater when poultry is kept under such "stress factors" as abnormal climate, subclinical disease level, overcrowding, fright, hyperactivity, and nutritional deficiencies.

The fish factor is found in fish solubles, fish meal, poultry offal, and probably also in dried - brewers yeast. Fish solubles, especially of the quality in which extraneous material does not settle out upon standing, is the most reliable source of the fish factor. Fish meal is a somewhat less reliable source. Some recent work has indicated that antibiotic and fermentation residues also contain the fish factor.

The economic advantage of using unidentified growth factors in practical poultry diets is considered, and data are presented in 12 tables such as table 2 (see over).

Dried whey, distillers dried solubles, and fish solubles each produces an added return when included at the 3 percent level in the basal diet. Dried whey produces an increase in profit at the 1.25 percent and 2.5 percent levels.

Other similar data from several experimental stations was reviewed. The range of added income obtained ran from $10 per thousand birds up to $101 per thousand birds by inclusion of a single unknown

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COMMERCIAL FISHERIES ABSTRACTS VOL IX, NO 12 PAGE 15
UNITED STATES DEPARTMENT OF THE INTERIOR, FISH AND WILDLIFE SERVICE. ABSTRACTER: M. E. Stansby

6.54 FISH MEAL FOR HUMAN CONSUMPTION

Anonymous
La Revue de la Conserve 10, 56 (1955)
Food Manufacture 31, 159 (April 1, 1956)

A new process for the preparation of fish meal for human food has been presented in France. The process has as its basis a practical and economical method of completely eliminating oils and fats from fresh fish so as to permit the preparation of a fish meal free from oily odor and flavor. This type of meal is suitable for human use.

Fat is removed from the fresh fish with acetone and alcohol in three stages as follows: (1) the fresh fish in paste form is dehydrated with acetone, (2) the acetone dehydrated paste is then extracted with hot ethyl alcohol, and (3) the alcohol extracted paste is dried and lipoid substances are extracted.

Solvents used in the extraction process can be recovered by distillation and reused indefinitely. Fish oils and fats obtained by this process are of a quality that enables them to find a ready market for use in a variety of products.

COMMERCIAL FISHERIES ABSTRACTS VOL IX, NO 12 PAGE 15
UNITED STATES DEPARTMENT OF THE INTERIOR, FISH AND WILDLIFE SERVICE ABSTRACTER: Martin Heerdt

6.3 A TENTATIVE METHOD FOR THE DETERMINATION OF THE GRADE STRENGTH OF AGARS

Jones, N. R. (British Food Manufacturing Industries Research Association, Leatherhead, Surrey, England)
The Analyst 81, 243-244 (April 1956)

Introduction.--A method based on a determination of the percent of agar needed to prepare a standard agar-water jelly has been proposed for grading agar. Agar quality is measured in terms of grade strength or (g), which is the grams of jelly of standard strength obtainable from 1 gram of agar. A standard agar jelly when measured at a deflection of 20° on a F.I.R.A. jelly tester has a strength of 75 g. Measurements were made with jellies prepared at agar concentrations of 0.5 and 1.0 percent. The agar concentration needed to prepare a jelly with a strength of 75 g. was found by interpolation.

Jelly preparation.--Representative 2.5 and 5.0 gram samples of agar are weighed out, and each is placed in 500 milliliters of water in a tared 1-liter beaker. If shredded agar is being graded, it must be soaked for at least 2 hours, whereas powdered agar does not require soaking. The agar and water mixture is now heated to boiling, and allowed to simmer for 5 minutes. The agar, if of the powdered variety, is stirred to prevent it from sticking. After the mixture has simmered for 5 minutes, hot water is added to each beaker with thorough stirring until the net weight of the solution is 500 grams. The dilute hot agar solution (over 50° C.) is then poured into three 2-inch square jelly boxes to completely fill each box. The jelly surface of each full box is then covered with a 2-inch square of waxed paper or water proof cellulose film and all of the filled boxes are cooled in a bath of cold running water. These boxes are of the type supplied for use with the F.I.R.A. jelly tester. As soon as the jelly has set it is transferred into a refrigerator and held overnight at 5° C.

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COMMERCIAL FISHERIES ABSTRACTS VOL IX, NO 12 PAGE 15
UNITED STATES DEPARTMENT OF THE INTERIOR FISH AND WILDLIFE SERVICE ABSTRACTER: Martin Heerdt

8.51 A CRYSTALLINE COMPONENT OF CARP MYOGEN PRECIPITATING AT HIGH IONIC STRENGTH

Henrotte, J. G. (Laboratory of General Biology, University of Liege)
Nature 176, 1221 (December 24, 1955)

Fractionation of carp myogen with ammonium sulphate reveals the occurrence of a component precipitating at neutral pH between 90 and 100 per cent saturation of ammonium sulphate. We have succeeded in isolating this constituent by the following method.

Fresh muscles are minced and extracted with water for 1 hr. at 2° C. The supernatant separated by centrifugation is dialysed in the cold against water. The globulins precipitated are discarded. The solution is brought to 88 per cent saturation by addition of solid ammonium sulphate and the pH is adjusted to 6.5. After elimination of the precipitate, solid ammonium sulphate is added to 98 per cent saturation. The solution is gently stirred for 1 hr. in the cold; the precipitate is separated by centrifugation and dissolved in a small amount of water. This solution, which gives rise to an important crystallization within 24 hr. at 2° C. has been examined by electrophoresis, ultracentrifugation and spectrophotometry, after dialysis against a phosphate–sodium chloride buffer of $\underline{I} = 0.15$ and pH 7.3 ($\underline{I}$=0.1 phosphate + 0.05 sodium chloride).

Two electrophoretic gradients of closely similar mobilities are observed on the ascending side corresponding to the main gradient of carp albumins described by Hamoir which migrate at -3×10^{-5} (ascending) and -2.5×10^{-5} (descending) cm.^{2} volt^{-1} sec.$^{-1}$ (same buffer as above). In the ultracentrifuge, a single peak is obtained with a corrected rate of sedimentation of about 1.5 S.

The ultra-violet absorption spectrum is shown in Fig. 2. It differs surprisingly from that usually

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UNIDENTIFIED GROWTH FACTORS

AGAR GRADE STRENGTH TEST

FISH MEAL FOR HUMAN FOOD

CRYSTALS FROM CARP MYOGEN

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Jelly testing.--Jellies are removed from the refrigerator and tested at a temperature range 5° to 8° C. on a F.I.R.A. jelly tester after the covering paper has been removed. Jelly temperature is checked after the test has been made. To make the actual test, water is run into the basket of the jelly tester at the rate of 100 milliliters per minute; and the amount of water required to produce a spade deflection of 20° is measured. A blank test is made with water in the jelly box, and the result is subtracted from the readings obtained for the jellies. The value obtained is the jelly strength in grams. After the mean value for each batch of 3 jellies has been calculated, the concentration of agar required to give a jelly strength of 75 g. is determined by interpolation. One hundred divided by the concentration found (expressed as percent) gives the grade strength of the agar.

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observed with proteins. The absorption at 280 mμ is very low, and three peaks are observed at about 253, 259 and 264 mμ, identical to those described by Fromageot and Schnek in the case of phenylalanine at neutral pH. This protein appears, therefore, to contain very little tyrosine and tryptophan, and a much higher proportion of phenylalanine. No protein, except gelatin, seems to have been described so far having such an unbalanced composition in cyclic amino-acids.

The occurrence in carp muscle albumins of a protein fraction having such electrophoretic and ultracentrifugal properties has already been inferred from the study of whole extracts; but except myoglobin, no component had been isolated and crystallized hitherto from these low-molecular weight proteins, which appear to occur only in muscles of cold-blooded vertebrates.

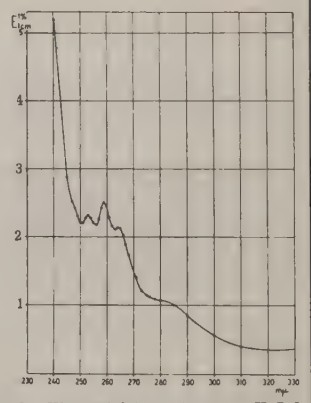

Fig. 2. Ultra-violet spectrum at pH 7.3. Ordinate, optical density of a 1 percent solution; abscissa, wave-length in mμ.

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growth source. When unidentified growth factors from two or more sources were used, the added income was always greater. In the author's opinion, the feed manufacturers should use more than one unknown growth factor source for the whey factor and one source for the fish factor.

Table 2--Effective Level of Unidentified Growth Factor Supplements in Chick Starting and Growing Diet--Data presented by T. D. Runnels at a research conference May 24, 1955.

	Income	Ingredient cost	Income over Ingredient cost	Added return over basal
		per 1,000 birds		
Basal	$855.00	$295.65	$559.35	$. . . .
3% Fish solubles	920.00	322.06	597.94	38.59
3% Dried whey	920.00	322.04	597.96	38.61
3% Distillers dried solubles	905.00	307.77	597.23	37.88
3% Fish solubles + 3% dried whey	945.00	334.75	610.25	50.90
3% Fish solubles + 3% distillers dried solubles	930.00	315.48	614.52	55.17
3% Dried whey + 3% distillers dried solubles	937.50	324.11	613.39	54.04
3% Fish solubles + 3% dried whey + 3% distillers dried solubles	965.00	341.22	623.78	64.43

6.54 (Cross Reference: 6.132)

7.61 RAPID ESTIMATION OF VITAMIN A USING A SURFACE ACTIVE AGENT

Gade, E. T. and Kadlec, J. D. (The Borden Co., Special Products Division, Elgin, Illinois)
Journal of Agricultural and Food Chemistry 4, 426-427 (May 1956)

The procedure for the determination of vitamin A in food products is based on the solubilization of lipid material by a surfactant, and extraction of the vitamin A with a mixed solvent. The method was developed for determining vitamin A in powdered milk formulas for infants, but with slight modifications was found to be satisfactory for similar determinations in other materials. The following method is used for analysis of food:

A 1.0- to 5.0-gram sample is weighed, transferred to a 100-ml. glass-stoppered cylinder containing 25 ml. of a surface active agent, and mixed thoroughly. The surface active agent consists of 12 grams of Triton X-100 (Rohm and Haas Co., Philadelphia, Pa.) and 28 grams of sodium tripolyphosphate (Victor Chemical Works, Chicago, Ill.) dissolved in 800 ml. of water and diluted to 1000 ml. with methanol. Then 25 ml. of mixed solvent (petroleum ether, boiling point 30° to 60° C., and diethyl ether, 10 to 90 by volume) is added. The cylinder is placed on a mechanical shaker for 15 minutes. After the solvent layer has separated, a suitable aliquot is removed, placed in an Evelyn tube, and evaporated to dryness under vacuum while the tube is swirled in a hot water bath. The residue is dissolved in 2 ml. of chloroform. The chloroform solution is usually clear; if not, the evaporation is repeated. The vitamin A content of this solution is determined by the Carr-Price method, using an Evelyn photoelectric colorimeter.

Table I shows the recovery of various increments of vitamin A in six replicate samples of a powdered formula fortified with vitamin A palmitate. A known amount of USP standard A oil was added to each replicate sample and extracted as described above.

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ABSTRACTER: John A. Dassow

8.65 DETERMINATIONS OF FREE AND BOUND ASCORBIC ACID IN FISHERY PRODUCTS

Hastings, W. H. and Spencer, C. F.
J. mar. Res., New Haven 11, 241-244 (1952)
Food Science Abstracts 27, 628 (November 1955)

'Bound' and 'free' ascorbic acid were determined separately in samples of albacore (Thunnus germo), silver salmon (Oncorhynchus kisutch), Pacific herring (Clupea pallasii), Pacific oyster (Ostrea gigas), and Olympia oyster (Ostrea lurida), by a modification of the method used by Sumerwell and Sealock (see J. biol. Chem., 1952, 196, 753), which involves extraction with alcohol and digestion of the residue with trichloroacetic acid. The free ascorbic acid, soluble in 95% ethanol, constituted about 85 % of the total vitamin C, and the bound ascorbic acid, insoluble in 95% ethanol, 15%. The total content estimated from the sum of the free and bound ascorbic acid was not significantly different from that determined photometrically. Fresh silver salmon muscle was typical of most fish products, having a low content of total ascorbic acid with no appreciable proportion in the bound form. Some fish products, however, contain sufficient ascorbic acid to be of importance as dietary sources, e. g. albacore muscle contained 5.1 mg per 100 g and whole fresh oysters 38.1 mg per 100 g. Retention of the vitamin on processing varied with the different products; 20% of the ascorbic acid in fresh Pacific oysters was lost during canning.

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8.51 AMINO ACID COMPOSITION OF ELASTOIDIN

Damodaran, M.; Sivaraman, C.; and Dhavalikar, R. S. (National Chemical Laboratory of India, Poona)
The Biochemical Journal 62, 621-625 (April 1956)

Introduction

Krukenberg gave the name "elastoidin" to the fibrous protein of the fin-rays of the elasmobranch, Mustelus laevis in 1885. It was classed as a collagen even though it did not give gelatin in boiling with water because of its wide-angle X-ray diffraction patterns.

Preparation of Samples

Dorsal fins of the shark Carcharinus melanopterus were obtained from specimens within 12 hours after they were caught. The fins were split into two halves and soaked 48 hours in water under toluene, the water being changed frequently. Fin-rays up to 9 inches in length and 2 millimeters in diameter were pulled from the fin individually and washed free from adhering tissue. The fibers were immersed 48 hours at 37° in a 2 percent sodium bicarbonate solution containing 1 milligram of trypsin per milliliter of solution. The fibers were washed repeatedly in distilled water, and preserved in cold water under toluene. For analysis the fibers were macerated in a Waring blendor with water at 0°, filtered, washed with acetone, and defatted by Soxhlet extraction with light petroleum.

Analysis

Moisture was determined by drying to constant weight over potassium pentoxide at 110° and 1 millimeter pressure. Nitrogen, determined as crude protein by the micro-Kjeldahl method, was found to be

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ABSTRACTER: Claude Thurston

8.51 PROTEIN DECOMPOSITION IN SEMI-PRESERVED HERRING

Alm, Frithiof (Swedish Institute for Food Preservation Research, Göteborg, Sweden)
Symposium on Nutritive Aspects of Preserved Food, October 1954, Swedish Institute for Food Preservation Research Publication No. 115, 108-111 (1956)

Semi-preserved herring are prepared and sold under the name of "Gaffelbitar", "Anchovy" and other names and used as "hors-d'oeuvres." These products are not sterile; however, microbial growth in them has been retarded considerably by the addition of 10 to 12 percent salt, and sometimes by preservatives such as benzoic acid. Semi-preserved herring are usually made as follows: Fresh herring, sometimes headed and eviscerated, are blended with a mixture of salt, sugar, and spices and then allowed to stand in barrels in a cold place. "Anchovy" style is made from whole sprats (Clupea sprattus). After a few days a brine is extracted from the body fluids of the herring as a result of the high osmotic pressure of the salt and sugar.

In a period of weeks the herring ripens and changes into a rather soft food product with a very distinctive taste, consistency, and appearance. The semi-preserved herring are then cut into pieces or fillets, and packed into tins with a distinctive kind of sauce that usually contains salt and vinegar, and sealed. These products have a limited shelf-life and must be kept under refrigeration.

Purpose.--To learn about the ripening process the author investigated the Swedish anchovy which is allowed to ripen in the tin can. This paper is a summary of his results.

Experimental and results.--Raw sprats were packed directly into 4-gram-capacity tins with a dry mixture of salt, sugar, and spices. A decided decrease in the total weight of the sprats occurred during the first few days and brine appeared. Then the weight of the sprats began to increase and the

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ABSTRACTER: Martin Heerdt

RAPID VITAMIN A ASSAY

AMINO ACIDS OF ESLATOIDIN

ASCORBIC ACID IN FISH

PROTEIN CHANGES IN PRESERVED HERRING

º 51 (Cross Reference: 1.79)

17.2 percent after correcting for moisture, 5.27 percent and ash, 0.73 percent. Sulfur by the Pirie (1932) method was 0.51 percent. Ester-bound sulfur determined as sulfate after hydrolysis with 5-normal hydrochloric acid for 20 hours at 100° (Lugg 1938) was 0.03 percent. Hydrolysis was carried out by treating 1 gram samples with 200 milliliters of 6-normal hydrochloric acid and refluxing 20 hours at 135° to 140°. Amino acids were separated by chromatography using Dowex-50 columns as described by Moore and Stein (1951). 1 x 100 centimeter columns were used for the acidic and neutral acids, whereas 1 x 15 centimeter columns were used for the basic acids. Cystine was estimated polarographically by the method of Stern, Beach, and Macy (1939). Methionine was determined by the volatile-iodide method of Baernstein (1936). Tryptophan was estimated by the para-dimethylaminobenzaldehyde method of Horn and Jones (1945). Ammonia was determined by microdiffusion of the hydrolysates according to the Conway method (1947).

Results

The fibers shrank in water to 30 percent of their original length and could be elongated under tension to 85 percent of their initial length. The native fibers showed strong birefringence under the polarizing microscope but the shrunk fibers did not. The intact fibers resisted the action of crystalline trypsin, were slightly acted on by papain, and completely dissolved by crystalline pepsin. The shrunk fiber was completely digested by all three enzymes. Of the 20 amino acids detected the most important were: glycine, proline, alanine, and glutamic acid. The 7.15 percent tyrosine, and 0.35 percent cystine are in contrast with cattle collagens which have very little or none of these present. Except for these two, the amino acid distribution follows the general pattern characteristic of collagens, and justifies its inclusion in the collagen group of proteins made on the basis of physical studies.

8.51 (Cross Reference: 1.2)

volume of the brine began to decrease until each reached, respectively, a maximum and a minimum after 3 or 4 weeks. Now the total weight of the fish began slowly to diminish and the brine to increase.

To follow the changes in the sprat proteins during the ripening process the author separated actomyosin from the other proteins. This was accomplished by dissolving the proteins in a 5-percent sodium chloride solution, centrifuging, and diluting the supernatant liquid tenfold with water to precipitate actomyosin by the methods of Dyer et al.

Nearly 90 percent of the nitrogenous substances in fresh sprats were soluble in 5-percent sodium chloride solution, but during the first week after preparation of the sprats solubility decreased very rapidly, primarily because of denaturation of the actomyosin. The solubility of the non-myosin soluble proteins did not change. After denaturation of the actomyosin, which caused a minimum of solubility of the proteins, the nitrogenous substances again became more soluble. When the desired degree of ripening was reached after about 12 weeks, the amount of soluble nitrogen was about equal to the amount of soluble nitrogen in raw sprats. This increase in solubility was caused by decomposition of the proteins, mainly actomyosin.

After the first two weeks of ripening the salt-soluble myosin fraction remained unchanged, the non-myosin protein fraction increased somewhat, and the non-protein fraction increased considerably. This may be interpreted as the decomposition of actomyosin into smaller molecules each of which was soluble in water. Some of these molecules were still of protein character, but the major part consisted of units smaller than proteins and even contained some amino acids. A two-dimensional paper chromatogram of an extract of ripened sprats showed at least 12 free amino acids.

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The method is suitable for the analysis of feed supplements which are extracted as follows:

A 20-gram sample is placed in a 250-ml. glass-stoppered Erlenmeyer flask containing 30 ml. of surfactant; 10 ml. of methanol is added to aid in separation. The sample is mixed well and extracted by shaking vigorously for 15 minutes with 50 ml. of mixed solvent. An aliquot containing 50 γ vitamin A is evaporated to dryness, using mild heat and reduced pressure. The residue is taken up in 10 ml. of hexane (Skellysolve B). From this point the chromatographic and colorimetric steps are followed as in the AOAC procedure.

Table I Recovery of USP Standard Vitamin A Acetate Added to a Fortified Infant Formula Using Surfactant

Increment γ	Vitamin A Measured γ	Recovery γ	Recovery %
0.	2.52	. . .	. . .
1.20	3.62	1.10	92
1.80	4.26	1.74	97
2.40	4.92	2.40	100
3.00	5.52	3.00	100

Replicate vitamin A estimations on various materials by these methods are shown in Table II (omitted). Liver and the powdered formula gave good replication of results, while the feed supplement, which contained stabilized vitamin A, gave somewhat erratic results, probably due to the method of sampling. Tests using the surface active agent were compared with tests using the unsaponifiable fraction and gave a good correlation. Stabilized vitamin A, which is insoluble in organic solvents, was determined in feed supplement containing N, N'-diphenyl-p-phenylenediamine by using a preliminary washing of the sample with ether to remove the latter compound.

8.65

9.4 BOSTON FISHERIES COOPERATIVE FORMED ON FISH PIER

Anonymous
Fishing Gazette 73, 196 (April 1956)

On March 2, 1956 the Boston Fisheries Cooperative was incorporated under the laws of the State of Massachusetts.

The Boston Fisheries Cooperative is a sales agency sponsored by 21 wholesale fish dealers for the express purpose of marketing the products of its members on a national basis.

The impetus given the formation of this group was derived from the realization that the present day fishing industry is a highly competitive, integrated big business, national in scope. One specific aim of the organization is to merchandise haddock, which is caught only in the North Atlantic, on a national basis.

Quality standards and controls, inspection procedures, sanitation codes, handling and processing methods, packaging techniques, and merchandising formulas have been established by the cooperative. The goal will be to produce a uniform high-quality product under the cooperative's brands.

The productive capacities of the member plants offers the merchandising staff the opportunity to provide institutional and consumer service with a complete line of all North Atlantic seafood under one label.

The program of the cooperative calls for the development of new products, and the expansion of activities including the modernization and enlargement of the present fishing fleet.

ABSTRACTER: Kathryn L. Osterhaug

9.4 FEDERAL RESEARCH INSTITUTION FOR FISHERY, INSTITUTE FOR FISH PROCESSING, GERMANY

Anonymous
Food Science Abstracts 27, 251-252 (May 1955)

The Institute for Fish Processing forms part of the Federal Research Institution for Fishery, of the Federal Ministry for Food, Agriculture and Forestry, to which the Institute for Sea Fishery, the Institute for Inshore and Inland Fisheries, the Institute for Net and Material Research, and the Biological Institute of Heligoland, also belong. All these Institutes are under the general direction of Oberregierungsrat Dr. P. F. Meyer-Waarden. The Institute for Fish Processing has developed from the Research Institute for the Fish Industry, which was established in 1922. The Institute was destroyed during the war; it is now temporarily housed, but will soon move into a new building.

The activities of the Institute are subdivided into (a) current work for the promotion of sales (examination of landed herring, improvement of processing methods with the aim of preventing waste and loss of quality, examination and evaluation of raw and accessory materials); (b) an examination and inspection service for the control of quality of fish products for home consumption and for export (issue of clearance certificates); (c) examination of samples for the customs administration and the commercial export office for food and agricultural products; (d) information to authorities and public bodies, as well as expert opinions for Courts of Law; (e) research.

Food chemistry section.--Investigations of chemical preservatives (residues, determination). Tests of the suitability of dyes intended for colouring fish products. Rapid procedures for the examination of fresh fish and fish products. Chemical methods for the determination of vitamin B_{12}. Improvement of jelly infusions for cooked marinades. Use of monosodium glutamate. Freezing in alginate jelly. Improvement in quality and keeping quality of maatjes herring. Investigations of the possibility of replacing foreign edible oils by German fish oil. Testing and examination of new means of packaging.

(over)

Reprinted in whole

9.7 ENGLISH STYLE IN SCIENTIFIC PAPERS

Baker, John R. (Department of Zoology, Oxford University)
Science 123, 713-714 (April 27, 1956)

The author points out that many scientific papers published in Great Britain are written in a style quite different from that adopted by good English authors. This deviation would be an advantage if an improved version of our language had been invented for scientific papers. No improvement, however, is found.

If those passages that are least in accord with good English style are examined, one finds three main kinds of error, which may be classified as those of grammar, grandiloquence, and German construction.

Grammar.--The words ending in "ing" are frequently misused. Such statements as the following occur repeatedly: "Examining a capillary under the microscope, after staining with carmine, it resembles a homogeneous hyaline tube." The author states that anyone who is intelligent enough to carry out scientific research at a university can easily grasp in 15 minutes everything that is essential to know about present participles and gerunds.

Grandiloquence and genteelism.--The menace of grandiloquence seems to derive from the time when doctors used many Latin words, for these errors are more common in medical and biological than in chemical and physical writings. It is surprising that an Englishman will write "vide supra" when he means "see above." Those who use Latin tags freely, often do not know enough of that language to realize that "data" is plural.

(over)

ABSTRACTER: F. Bruce Sanford

9.7 SCHOOL LUNCH FISH-COOKERY DEMONSTRATIONS IN OKLAHOMA

Seifert, Robert P.
Commercial Fisheries Review 18, 6-8 (April 1956)

A total of 36 fish-cookery demonstrations were given in Oklahoma during the spring of 1954 by the U. S. Fish and Wildlife Service in cooperation with the Oklahoma School Lunch Division and the U. S. Department of Agriculture. Some 1,600 managers, cooks, and workers representing 632 schools throughout the State were in attendance. Nearly 120,000 children are fed daily in these schools, which have a total enrollment of over 220,000.

The purpose of these demonstrations was threefold: (1) to encourage greater use of fishery products in the school lunchrooms of the State, (2) to show lunchroom personnel improved or varied methods of preparing fish, and (3) to encourage use of a wider variety of fishery products.

To determine the effectiveness of the demonstrations in achieving these objectives, a survey was made of the use of fish in the schools before and after the demonstrations. The menus for 359 schools that had personnel attending a fish-cookery demonstration were checked against the menus of the 205 schools not represented at any demonstration.

Similar demonstration programs in many other states have increased the use of fish in schools approximately 50 percent. However, the results in Oklahoma did not follow this trend. As shown in table 1, Oklahoma schools represented at the demonstrations showed a decrease of 8 percent in their frequency of fish use after the demonstrations. But, at the same time, the use of fish in schools not represented at the demonstrations showed a decrease of 28 percent.

(over)

ABSTRACTER: Roy C. Stevens

FISHERIES COOPERATIVE

INSTITUTE FOR FISH PROCESSING

WRITING SCIENTIFIC PAPERS

FISH-COOKERY DEMONSTRATIONS

9.4

Physical chemistry section.--High frequency sterilization of certain fish products. Testing of a new electrical apparatus for measurement of pH. Examination of the degree of freshness of edible crabs in ultra-violet light. Investigations of the feeding value of dried shrimps. Studies of the composition of and changes in fish proteins. Development of a method and an electrical apparatus for the objective determination of the degree of freshness of fish. Determination of the capacity of cans, and measurement of the effect of base pressure in cans. Investigations of the prevention of pseudo-swelling of cans. Testing of cutting tables made of Vulcollan (a special plastic material). Abatement of stench from fish meal factories.

Bacteriology section.--Investigations into the causes of spoilage of marinades. Testing the possibilities of preparing mild marinades with adequate keeping quality. Production of a feeding-stuff from fish by ensilage. Investigation of the cause of formation of "lardiness" (Speck) in coalfish (Gadus virens). Examination of the effect of preservatives and disinfectants on a specific bacterial flora. Investigation of the diminution of bacteria on the surface of fish fillets by means of ultra-violet irradiation. Improvement of killing and washing procedures on board fishing vessels. Factory Hygiene.

Physiology section.--Determination of the vitamin A content of raw products (fish, roe, shrimps) and of the contents of vitamins A and D in fish oils. Investigations of the effects of commercial processing on the vitamin contents and on the nutritive value of fish products.

Note.--While the Institut fur Fischverarbeitung is the only one of the five Institutes comprising the Bundesforschungsanstalt fur Fischerei which is wholly devoted to work on fish technology, and the other Institutes are concerned mainly with work on fishery problems, mention should be made of investigations on fish proteins which are being carried out in the Physiology section of the Institut fur Kusten- und Binnenfischerei (Institute for Inshore and Inland Fisheries), Hamburg, under the direction of Oberregierungsrat Dr. P. F. Meyer-Waarden, in co-operation with the Institut fur Fischverarbeitung and the Chemisch-Physiologischen Institut des Universitatskrankenhauses Eppendorf. Electrophoretic and paper-chromatographic methods are being developed for the study of the proteins of fish and crustaceans.

9.7

Because the declines in the use of fish after the demonstrations were so unusual, it appeared likely that there must be some other factors which had influenced the choice of menus in the Oklahoma schools during the period surveyed after the demonstrations of fish cookery. On investigation it was found that large quantities of beef, beans, and cheese had been distributed to the schools in the fall of 1954. This distribution of free protein rich food was so ample that the schools could, if they chose, virtually eliminate the buying of any other "main dish" ingredient. Under these circumstances it is somewhat surprising that the schools used as much fish as they did in 1954. The fact that the decline in the use of fish was held, in those schools represented at a demonstration, to only 8 percent is indicative of the value of the demonstrations to the schools, especially since nonrepresented schools showed a 28-percent decrease in their use of fish or a 3.5 times greater decline than the first group of schools.

Table 1 - Results of Oklahoma School Lunch Fish-Cookery Demonstrations

Item	Times Fish Were Used Per Month Per School			Average Amount of Fish Used Per Month Per School		
	Demonstration		Percentage	Demonstration		Percentage
	Before	After	Change	Before	After	Change
	No.	No.	%	Lbs.	Lbs.	%
For Schools:						
Represented	1.3	1.2	- 8	28.0	26.1	- 7
Not Represented, .	1.1	.8	-28	18.4	13.1	-29

9.4 (Cross Reference: 2.6, 3.26)

9.7

When a grandiloquent author wants to say that something is visible to the naked eye on merely opening the body cavity, he will write: "this phenomenon can be macroscopically observed upon laparotomy." Sometimes he uses short words but in an elaborate way. If he wants to refer to a sheet of metal about 1/100 inch thick, he says that it is "of thickness~10^{-2} in." If he wants to tell his readers that the longest of the six pairs of chromosomes in a cell is about three times as long as the shortest, he writes, "the maximum size range of the six pairs as represented by the ratio length of chromosomes 1/length of chromosome 6 is about 3/1."

The grandiloquent author brings in abstract words where none is required. Instead of writing "because the surface of the retina is spherical," he substitutes "because of the sphericity of the retinal surface." Instead of saying that something is near the nucleus, he says that it "occupies a juxtanuclear position."

Genteelism is allied to grandiloquence. People who think it polite to call a napkin a "serviette" have their counterparts in science who call a paste or mash a "Brei." Another example is "sacrificed" for "killed." There are also the words that must never be used. Thus, the archaic "save" is substituted for "except", "approximately" for "about", and "discrete" for "separate."

German construction.--Grandiloquence and related foibles, however, are not the worst enemies of good English. A still more insidious evil exists.

In ordinary writing, no one would say "a tea containing cup" instead of "a cup containing tea." Yet in scientific writing, authors often say "iron containing globules" instead of "globules containing iron." Why place a complex adjectival phrase before the noun, and why omit the clarifying preposition? Why say "nonformalin containing fixatives" instead of fixatives not containing formalin"? Why does an author who would never dream of saying "the Jones associated people" write the "nucleolus associated chromatin"?

Why write "a methylene blue stained preparation", "Dytiscus red flight muscle sections", "the use of acidified (byHNO_3) or alkalized (by ammonia) solutions of silver", or "adenosin triphosphate activated actomyosin contraction"? The author points out that these are words put together without the slightest attempt at clarity or consideration for the reader.

0.5 THE RELATION OF STOCK DENSITY TO "MILKINESS" OF LEMON SOLE IN UNION BAY, B. C.

Forrester, C. R.
Fisheries Research Board of Canada, Progress Reports of the Pacific Coast Stations No. 105, 11 (February 1956)

(Abstract of this article appears under 9.15 page 19 - November 1956)

0.5 NEW SPECIES OF MARINE BACTERIA TOLERATING HIGH CONCENTRATIONS OF COPPER

Sreenivasan, A.
Current Science 25, 92-93 (March 1956) (Reprinted)

Conditions necessary for the protection of fouling organisms from toxic constituents such as copper were created by marine bacteria that tolerated 750 to 1000 parts per million of copper sulfate.

0.5 SPOILAGE OF COMMERCIALLY CANNED FISH

Venkataraman, R. and Sreenivasan, A.
Journal of Scientific and Industrial Research 14A, 480-482 (1955) (Reprinted)

(Abstract of this article appears under 3.39 page 11 - October 1956)

1.0114 FISHING LAWS CHANGED

Anonymous
National Fisherman 36, 21 (July 1955)

(Abstract of this article appears under 9.3 page 19 - November 1956)

1.012 PACIFIC SHRIMP - RICH RESOURCE OF MODERN MEXICO

Ferreira, Hector
Pacific Fisherman 54, 169-173 (January 25, 1956)

(Abstract of this article appears under 1.85 page 5 - July 1956)

1.0142 DANISH FISHERMEN MAKE NORTH SEA PAY

Anonymous
World Fishing 5, 22-28 (January 1956)

(Abstract of this article appears under 2.1125 page 19 - May 1956)

1.016 FISHING INDUSTRIES RESEARCH INSTITUTE, UNION OF SOUTH AFRICA

Dreosti, G. M. (Portswoord Road, Capetown)
Food Science Abstracts 27, 486-488 (September 1955)

(Abstract of this article appears under 9.4 page 19 - October 1956)

1.1 AVERAGE YEAR'S FISHING CONDITION OF TUNA LONGLINE FISHERIES, 1952 EDITION

Anonymous (Translated from the Japanese language by Van Campen, W. G., Pacific Oceanic Fishery Investigations)
Special Scientific Report: Fisheries No. 169, United States Department of the Interior, Fish and Wildlife Service, Washington, D. C. (January 1956)

This publication, the "Atlas of Average Year's Fishing Conditions in the Tuna Longline Fisheries," is the work of the staff of the Nankai Regional Fisheries Research Laboratory of the Japanese Government Fisheries Agency, headed by Dr. Hiroshi Nakamura. Together with Dr. Nakamura's previously published "The Tuna Longline Fisheries as Seen from the Data of the Past," this is a presentation in a bird's-eye-view fashion of a large amount of data collected in the past.

1.1 (Cross Reference: 1.0117)

COMMERCIAL TUNA PACK BEGUN IN BILOXI

Anonymous
Southern Fisherman 16, 66-67 (June 1956)

1.1 LONGLINE FISHING FOR DEEP-SWIMMING TUNAS IN THE CENTRAL PACIFIC, 1953

Shomura, Richard S. and Murphy, Garth L. (U. S. Fish and Wildlife Service, Honolulu, T. H.)
Special Scientific Report: Fisheries No. 157, 1-70 (September 1955)

(Abstract of this article appears under 2.12 page 3 - October 1956)

1.32 TRANSPORT AND STORAGE OF FISH IN REFRIGERATED SEA WATER: III. CURD IN CANNED SALMON AS RELATED TO POST MORTEM AGE OF FISH

Schmidt, P. J. and Idler, D. R.
Fisheries Research Board of Canada, Progress Reports of the Pacific Coast Stations No. 104, 9-10 (November 1955)

(Abstract of this article appears under 2.15 page 5 - October 1956)

1.32 TRANSPORT AND STORAGE OF FISH IN REFRIGERATED SEA WATER: IV. PRELIMINARY REPORT ON NITROGEN LOSS, WEIGHT CHANGES, AND PROTEOLYSIS (BELLY-BURN)

Barker, R. and Idler, D. R.
Fisheries Research Board of Canada, Progress Reports of the Pacific Coast Stations No. 104, 16-18 (November 1955)

(Abstract of this article appears under 2.15 page 7 - October 1956)

1.5 RECOVERY OF COD BILE

Dugal, L. C. and Laframboise, A.
Fisheries Research Board of Canada, Progress Reports of the Atlantic Coast Stations No. 62, 10-12 (July 1955)

(Abstract of this article appears under 6.72 page 15 - November 1956)

2.01 INCREASE OF VOLATILE BASIC NITROGEN AND GROWTH OF BACTERIA IN THE MUSCLE OF FISH AT THE EARLY STAGE OF SPOILAGE

Horie, S. and Sekine, Y.
J. Tokyo Univ. Fish. 41, 69-74 (1954)
Food Science Abstracts 28, 265 (June 1956)

Bacterial counts on whole fish, hung up at 20° to 28°C. and high humidity, showed rapid multiplication of bacteria on the skin, reaching a maximum in 2 days; the muscle was then at an early stage of spoilage, as judged by content of volatile basic nitrogen, pH, and odor, but the numbers of bacteria in the muscle had increased little, if at all.

2.01 TRANSPORT AND STORAGE OF FISH IN REFRIGERATED SEA WATER: II. BACTERIAL SPOILAGE OF BLUE-BACK SALMON IN REFRIGERATED SEA WATER AND IN ICE, WITH AND WITHOUT ADDED CHLORTETRACYCLINE

Steiner, G. and Tarr, H. L. A.
Fisheries Research Board of Canada, Progress Reports of Pacific Coast Stations No. 104, 7-8 (November 1955)

(Abstract of this article appears under 2.114 page 3 - October 1956)

2.1120 NETTING AND ITS SECRETS PART TWELVE: FOURTH ROW TAPERING

Jeffs, F. E.
World Fishing 5, 58 (May 1956)

2.14 MARYLAND COMMERCIAL FISHING GEARS. III. THE CRAB GEARS

Cargo, David G.
Board of Natural Resources, State of Maryland, Department of Research and Education, Educational Series No. 36 (April 1954)

(Abstract of this article appears under 1.86 page 5 - July 1956)

2.14 EFFECTS OF SOUND WAVES ON YOUNG SALMON

Moore, Harvey L. and Newman, H. William
Special Scientific Report: Fisheries No. 172, United States Department of the Interior, Fish and Wildlife Service, Washington, D. C. (April 1956)

The objective was to determine whether any quantity or quality of underwater sound would attract or repel young salmon. Frequencies from 5 to 20,000 cycles per second were tested in an experimental tank and in open water. Two types of transducers were used. Other than an initial "start" by the fish, no reaction was demonstrated. Apparently fish are conditioned almost instantaneously to sounds. It was concluded that sound waves were ineffective as an attracting or repelling force.

2.6 COOPERATION AT TAMPA

Anonymous
Southern Fisherman 16, 36-41, 43-49 (March 1956)

(Abstract of this article appears under 9.4 page 19 - November 1956)

2.8 TASTE TESTING FROZEN MEAT COOKED BEFORE AND AFTER THAWING

Kotschevar, Lendal H. (Home Economics Department, Montana State University, Missoula)
Journal of the American Dietetic Association 32, 444-449 (May 1956)

"A check on preference indicated a choice significantly in favor of meat cooked from the unthawed state". Twenty-two references.

2.8 CORBINA! EUREKA!

Ober, Philip N.
Gourmet XVI, 14-15 (September 1956)

2.9 RADIOLOGIC CONTAMINATION OF FISH

Kawabata, Toshiharu (National Institute Health, Tokyo)
Japan. J. Med. Sci. and Biol. 8, 337-46 (1955)
Chemical Abstracts 50, 10286 (July 25, 1956)

I. Distribution and migration of contaminated fish on basis of the compiled data of radiological surveys.

II. Actual state of radiologic contamination in fish and its possible routes on the basis of the findings of the "Bikini Expedition."

III. Radiochemical studies of contaminated fish.

2.9 VITAMINS IN NORWEGIAN FISH II. VITAMINS IN THE VARIOUS ORGANS OF TUNA (THUNNUS THYNNUS) CAUGHT OFF NORWAY'S WEST COAST

Braekkan, Olaf R.
Report on Technological Research Concerning the Norwegian Fish Industry III, No. 3, 18 pp. (1955)

(Abstract of this article appears under 8.6 page 19 - October 1956)

3.17 IS BACTERCIDAL ICE FOR THE ICING OF FRESH SEA FISH ON BOARD FISHING VESSELS DESIRABLE OR AT ALL ADMISSIBLE?

Seeler, T.
Dtsch. Lebensmitt.-Rdsch., 55, 133-135 (1955)
Food Science Abstracts 28, 146 (April 1956)

The deleterious changes which take place in the fish flesh are due not so much to the action of microorganisms found on the surface of the fish as to damage caused by mechanical rough handling and consequent leakage of enzymes from the abdominal cavity into the rest of the body. The indiscriminate use of antiseptics in the ice used for the chilling or storage of sea fish is considered to have few advantages. The action of the antiseptics is unlikely to be effective in the deeper layers of the fish.

3.17 ANNUAL REPORT TO THE DANISH FISHERY INDUSTRY

Anonymous
Arsberetning fra Fiskeriministeriets, Forsogslaboratorium for 1954, 32 pp. (1955) (Copenhagen, Denmark)

(Abstract of this article appears under 2.15 page 5 - January 1956)

3.239 REFRIGERATION OF FISH. PART 3 FACTORS TO BE CONSIDERED IN THE FREEZING AND COLD STORAGE OF FISHERY PRODUCTS

Stansby, Maurice E.; Pottinger, S. R.; and Miyauchi, D.
Fishery Leaflet 429, 65 pp. (January 1956) Fish and Wildlife Service, U. S. Department of the Interior

(Abstract of this article appears under 3.249 page 9 - November 1956)

3.239 FROZEN OYSTERS

Morton, Margaret L. and Dyer, W. J.
Journal of the Fisheries Research Board of Canada 13, 47-51 (January 1956)

(Abstract of this article appears under 1.81 page 1 - October 1956)

3.239 TECHNOLOGICAL RESEARCH WITH SOUTHERN OYSTERS

Lee, Charles F. and Pepper, Leonard
Southern Fisherman 16, 55 (April 1956)

(Abstract of this article appears under 1.81 page 1 - August 1956)

3.33 ANOTHER OYSTER SHUCKER INTRODUCED

Anonymous
Southern Fisherman 16, 59 (March 1956)

(Abstract of this article appears under 2.3 page 5 - November 1956)

3.33 A PRELIMINARY STUDY ON THE PRESERVATIVE ACTION OF FURASUKIN AND MILD HEAT IN CANNING BANGOS

Navarro, Olympia B. and Sulit, Jose I.
The Philippine Journal of Fisheries 3, 35 (January-June 1955)

(Abstract of this article appears under 3.12 page 5 - June 1956)

3.33 TRANSPORT AND STORAGE OF FISH IN REFRIGERATED SEA WATER: III. CURD IN CANNED SALMON AS RELATED TO POST MORTEM AGE OF FISH

Schmidt, P. J. and Idler, D. R.
Fisheries Research Board of Canada, Progress Reports of the Pacific Coast Stations No. 104, 9-10 (November 1955)

(Abstract of this article appears under 2.15 page 5 - October 1956)

4.29 EFFECT OF FREE CARBOXYLIC GROUPS ON THE COURSE OF SULFUR TRIOXIDE SULFONATION OF UNSATURATED FATTY ACIDS

Sauls, Thomas W. and Rueggeberg, Walter H. C. (Tennessee Corporation Research Laboratories, College Park, Georgia)
The Journal of the American Oil Chemists' Society 33, 383-389 (September 1956)

4.29 ISOMERIZATION DURING HYDROGENATION. IV. METHYL ELEOSTEARATE

Allen, Robert R. and Kiess, Arthur A. (Research Division, Armour and Company, Chicago, Illinois)
The Journal of the American Oil Chemists' Society 33, 419-422 (September 1956)

A stepwise addition of two moles of hydrogen to the conjugated triene produced equimolar amounts of 9-, 10-, 11-, 12-, and 13-octadecenoates.

4.29 REACTIONS OF UNSATURATED FATTY ALCOHOLS. 1. PREPARATION AND PROPERTIES OF SOME VINYL ETHERS

Teeter, H. M.; Dufek, E. J.; Coleman, C. B.; Glass, C. A.; Melvin, E. H.; and Cowan, J. C. (Northern Utilization Research Branch, U. S. Department of Agriculture, Peoria, Illinois)
The Journal of the American Oil Chemists' Society 33, 399-404 (September 1956)

A number of vinyl ethers of C_{18} fatty alcohols have been prepared by reaction of the alcohol with acetylene at atmospheric pressure in the presence of a basic catalyst.

LIST OF PUBLICATIONS REGULARLY ABSTRACTED

Analyst
Analytical Chemistry
Archives of Biochemistry and Biophysics
Biochemical Journal
Bulletin of the Faculty of Fisheries, Hokkaido University
Bulletin of the Japanese Society of Scientific Fisheries
California Fish and Game
Canadian Fisherman
Canadian Journal of Chemistry
Canadian Journal of Technology
Canner
Chemical Abstracts
Chemical and Engineering News
Chemical Engineering
Chemical Processing
Chemistry and Industry
Commercial Fisheries Review
Drug and Cosmetic Industry
FAO Fisheries Bulletin
Federation Proceedings
Feedstuffs
Fisheries Newsletter (Australia)
Fish. Res. Bd. Can., Prog. Repts. Atlantic Coast Stas.
Fish. Res. Bd. Can., Prog. Repts. Pacific Coast Stas.
Fishing Gazette
Flour and Feed
Food Engineering
Food Manufacture
Food Packer
Food Preservation Quarterly
Food Processing
Food Research
Food Science Abstracts
Food Technology
Frosted Food Field
Gourmet
Industrial and Engineering Chemistry
Industrial Refrigeration
Institutions
Journal of Agricultural and Food Chemistry
Journal of Applied Chemistry
Journal of Biological Chemistry
Journal of Nutrition
Journal of the American Chemical Society
Journal of the American Dietetic Association
Journal of the American Oil Chemists' Society
Journal of the Association of Official Agricultural Chemists
Journal of the Fisheries Research Board of Canada
Journal of the Science of Food and Agriculture
Maine Coast Fisherman
Meldinger Fra SSF (Herring Industry, Norway)
Modern Packaging
Modern Refrigeration
National Fisherman
National Provisioner
Nature
Nutrition Reviews
Pacific Fisherman
Pan American Fisherman
Poultry Science
Practical Home Economics
Progressive Fish-Culturist
Quick Frozen Foods
Refrigerating Engineering
Report of the Food Investigation Board (Great Britain)
Science
Southern Fisherman
Trade News (Fisheries Department, Canada)
Western Fisheries
World Fishing

Articles chosen for abstracting or inclusion as bibliographical references are those deemed of interest to the commercial fisheries and to fishery technological laboratories. Occasionally pertinent articles from sources other than the above listed publications are included. Biological papers are generally omitted.

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Editorial Clerk (Typist)--Gladys K. Chandler

6.190 ILLINOIS PRODUCES BROILERS ON 1.93 FEED CONVERSION RATE

Anonymous
Feedstuffs 28, 1, 93 (August 18, 1956)

Broiler rations with 7 percent of fat added should contain about 25 percent protein. Feed conversion on the new ration was 20 percent better than any ration previously made up from common ingredients.

6.190 A GENERAL METHOD OF CALCULATING AMINO ACID REQUIREMENTS OF THE BROILER

Gordon, R. S. and Maddy, K. H.
Feedstuffs 28, 38-41 (September 29, 1956)

A theory has been presented which predicts the requirement for any amino acid based on a relationship which takes into account the influence of both the calorie and protein level of the diet and which also suggests the need for a proper ratio between all amino acids.

6.190 VITAMINS IN NORWEGIAN FISH II. VITAMINS IN THE VARIOUS ORGANS OF TUNA (THUNNUS THYNNUS) CAUGHT OFF NORWAY'S WEST COAST

Braekkan, Olaf R.
Report on Technological Research Concerning the Norwegian Fish Industry III, No. 3, 18 pp. (1955)

(Abstract of this article appears under 8.6 page 19 - October 1956)

6.193 COMPLEXITY OF A CHICK GROWTH RESPONSE TO EGG YOLK ANIMAL FAT AND FISH SOLUBLES ADDITIONS TO THE DIET

Arscott, G. H. (Oregon State College, Corvallis, Oregon)
Poultry Science 35, 338-342 (March 1956)

Results are presented showing the unidentified growth factor activity of dried egg yolk, animal fat and fish solubles when added to a sucrose-soybean meal-type ration and fed to New Hampshire-male × Delaware-female cross bred male chicks. Evidence is obtained indicating the complexity of the growth response obtained with the dried egg yolk supplement. The multiplicity of growth factors is discussed.

6.193 LIVER FACTORS FOR CHICK GROWTH

Anonymous
Nutrition Reviews 14, 179-180 (June 1956)

Progress in the isolation of new factors and the demonstration that they are not identical with known vitamins have been made.

6.193 RECENT ADVANCES IN POULTRY NUTRITION

Combs, Gerald F.
Feedstuffs 27, 39-40 (November 12, 1955)

(Abstract of this article appears under 6.190 page 17 - May 1956)

6.3 ECONOMIC MARINE ALGAE OF TROPICAL SOUTH AND EAST ASIA AND THEIR UTILIZATION

Zaneveld, J. S.
Indo-Pacific Fisheries Council Special Publications No. 3, FAO Regional Office for Asia and the Far East, Bankok (1955)

6.3 NON-THERMAL DRYING OF BROWN MARINE ALGAE

Reid, K. C. and Jackson, Philip
Journal of the Science of Food and Agriculture 7, 291 (April 1956)

Reduction of the water content of Ascophyllum nodosum and the stipe of certain sublittoral seaweeds to about 50 percent (wet basis) is possible and economical by air-drying on inclined grids. Removal of 40 percent or 60 percent of the water can be effected by use of centrifuges or screw expellers, but there is a simultaneous loss of a significant proportion of the soluble matter present. Plasmolysis using salt solutions is technically feasible, but is impracticable and uneconomical.

6.3 ENZYMATIC OXIDATION OF GLUCOSE TO GLUCOSONE IN A RED ALGA

Bean, Ross C. and Hassid, W. Z. (Department of Plant Biochemistry, University of California, Berkeley)
Science 124, 171 (July 27, 1956)

Evidence is presented that glucose and galactose are oxidized to glucosone and galactosone, respectively, in the tissue and extracts of Iridophycus flaccidum.

7.7 REPORT ON FISH AND OTHER MARINE PRODUCTS

Voth, Menno D. (Food and Drug Administration, Department of Health, Education, and Welfare, Seattle, Washington)
Journal of the Association of Official Agricultural Chemists 39, 603 (August 15, 1956)

It is recommended: (1) that the first action method for total solids in fish and other marine products except raw oysters (this Journal 37, 602 (1954)) be adopted as official; (2) that collaborative work on the first action method for total solids in raw oysters be continued; (3) that the use of chemical and viscosimetric methods for determination of solids in oysters be investigated.

7.7 REPORT ON TOTAL SOLIDS AND ETHER EXTRACT IN FISH AND OTHER MARINE PRODUCTS

Risley, H. M. (Food and Drug Administration, Department of Health, Education, and Welfare, Seattle, Washington)
Journal of the Association of Official Agricultural Chemists 39, 603 (August 15, 1956)

The first action method for total solids in fish and other marine products (except raw oysters) (this Journal 37, 70, 602 (1954)) was subjected to collaborative study during the past year. Five different fishery products were used: canned tuna in brine, frozen chum salmon, raw butter clams, canned butter clams, and canned grated tuna in oil.

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North America, U. S. fisheries, Gulf of Mexico		
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Bioassay of shellfish poison	5	2.9
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Bacterial fish spoilage at 28° C.	23	2.01
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4.23 SEPARATION OF ALKALI-LABILE PHOSPHOLIPIDES BY MEANS OF PAPER CHROMATOGRAPHY

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Journal of the American Oil Chemists' Society 32, 255-271 (May 1955)

(Abstract of this article appears under 4.00 page 13 - February 1956)

4.5 EFFECT OF IRRADIATION ON MEAT FATS

Scribney, Michael; Lewis U. J.; and Schweigert, B. S.
Journal of Agricultural and Food Chemistry 3, 958-960 (November 1955)

(Abstract of this article appears under 3.19 page 7 - April 1956)

5.594 THE DETECTION OF HYDROGENATED DOLPHIN OIL IN BUTTER BY THE BEZZI AND SACCONI METHOD FOR TRIACETIN

Ongaro, Dante
Boll. Lab. Chim. Provinciali (Bologna) 6, 4-7 (1955)
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6.134 NUTRITIVE VALUE OF HERRING MEALS 3. THE EFFECTS OF HEAT TREATMENT AND STORAGE TEMPERATURE AS RELATED TO OIL CONTENT

Biely, J.; March, B. E.; and Tarr, H. L. A.
Poultry Science 34, 1274-1279 (November 1955)

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7.591 EFFECTS OF TEMPERATURE AND SUNLIGHT ON THE ACTIVITY OF CATALASE IN FISH

Privol'nev, T. I.
Referat. Zhur., Khim. No. 43132 (1954)
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7.80 RELIABILITY OF PHENYLTHIOCARBAMIDE - SODIUM BENZOATE METHOD OF DETERMINING TASTE CLASSIFICATIONS

Hoover, Edward F.
Journal of Agricultural and Food Chemistry 4, 345-348 (April 1956)

The phenylthiocarbamide-sodium benzoate method of determining taste classifications of individuals is unreliable, because most persons do not give reproducible taste reactions with at least one of the two chemical compounds involved. One of the principal factors affecting the reproducibility is the inability of some individuals to define standard tastes correctly. Therefore the problem of classifying individuals into groups according to their taste perceptions remains unsolved and is much more complex than might be inferred from methods proposed earlier.

7.80 TIME-ERRORS IN THE PAIRED COMPARISON TASTE PREFERENCE TEST

Mitchell, John W.
Food Technology 10, 218-220 (May 1956)

Analysis of data from paired comparison taste preference tests on whiskey revealed a significant positive time-error, i.e., a greater frequency of choice of the first sample. The magnitude of the effect was directly related to the amount of taste difference between the paired samples. The greatest time-error was found when the difference was small and the least time-error when the difference was large. A conditioner sample, similar to the paired samples, when presented before the first sample of the pair eliminated the time-error.

8.53 COMPONENT FATTY ACIDS IN BODY FATS OF SOME MARINE FISHES

Karkhanis, Y. D. and Magar, N. G.
Journal of the American Oil Chemists' Society 32, 492-493 (September 1955)

(Abstract of this article appears under 4.11 page 11 - April 1956)

8.53 THE YIELDS AND CHARACTERISTICS OF THE TECHNICAL DOLPHIN OIL OBTAINED FROM THE BLUBBER OF DELPHINUS DELPHIS L. DEPENDING ON THE DURATION OF MELTING TIME

Rankov, G. and Iovchev, A.
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Chemical Abstracts 50, 7482 (May 25, 1956)

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Proceedings Distillers Feed Conference 11, 11-15 (March 7, 1956)

(Abstract of this article appears under 7.642 page 17 - November 1956)

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